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THE UNITED STATES OF AMERICA

A STUDY OF THE AMERICAN COMMONWEALTH,
ITS NATURAL RESOURCES, PEOPLE,
INDUSTRIES, MANUFACTURES, COMMERCE,
AND ITS WORK IN LITERATURE, SCIENCE, EDUCATION,
AND SELF-GOVERNMENT

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IN TWO VOLUMES
VOL. II

WITH MANY ILLUSTRATIONS

NEW YORK
D. APPLETON AND COMPANY
1894

Checked
May 1915

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THE UNITED STATES OF AMERICA.

CHAPTER I.

PRODUCTIVE INDUSTRY.

In dealing with this subject the word *capital* will be used in its scientific sense, as the synonym for a product of labor which has been saved for future productive use. The stone axes and other stone implements which have been found under the glacial drift may be taken as the oldest examples of capital that are still in existence. There are people now in the world who make use of similar instruments in their customary life, and who could use their prehistoric types if they were placed in their charge.

The fine cloth made of flax, in which the Egyptian mummies are incased, may be taken as an example of the oldest textile fabric, rivaling in its fine, even quality of texture the best products of the modern loom.

The distaff may be taken as a type of the oldest form of spinning machinery. The hand loom, which still supplies the woven fabrics for a large portion—perhaps the largest—of the population of the globe, represents the oldest kind of mechanism applied to weaving. Instruments of production of the types named are examples of prehistoric forms of capital, corresponding to the very first that could ever have been applied to productive industry. Those which have existed in the world in the far-distant past may probably be found in use somewhere in the world at the present time. Were the managers of the next Universal Exposition so inclined, they might import from Patagonia and from Alaska the men who even now prepare flint implements and use them as weapons of war, of the chase, or in the household arts. Upon that beginning they might develop a series of examples of all kinds of tools that have ever existed. Examples of all such tools could be assembled from various parts of the world so as to bring

before the eye at one glance the whole unfolding of art and industry in the applications of flint, of bronze, of iron, of steel, and of modern alloys to all the processes which require the application of cutting implements.

Again, if the writer is rightly informed, men and women might be imported from one part of the world who have not yet attained the art of spinning fibrous substances, even with the distaff. It is alleged that the Finns draw or roll out what are generally called rovings upon their knees in preparation for spinning; then spin the threads with their fingers, as any one may with a little practice make a strong cord from cotton gathered in the field. In any event, whether this be true or not, men and women could be brought from many parts of the world—from Greece, from Sweden, from Peru, from Mexico, and from many other places—who now spin the fibers of flax, of wool, and of cotton with the distaff, and who weave the threads into cloth without a loom of any kind; fastening one end of the web to a stick which is held in the crotch of a tree, while the other end of the web is tied around the waist of the weaver.

On these prehistoric foundations marking the beginning, the whole art of spinning and weaving could be assembled and its development illustrated in all its stages in a single building. The spinning-wheel which succeeded the distaff and the hand loom are even now in customary use for providing the fabrics with which people in many parts of our own country and Canada are clothed at the present time.

Thus, in one building devoted to cutting implements, and another to the textile arts, a perfect object-lesson in the development of productive industry in these branches could be brought before the eye of every student.

There are many other arts which could be illustrated in the same way; in some of them hardly any change has been made in the course of centuries. The potter's wheel which is used to-day is substantially the same as that which was used in prehistoric times. The art of making hand-made paper as it is now conducted in China and Japan, yielding a product which in some respects can not be rivaled even in the very best of our modern paper mills, would be an example of the beginning in the development of the art of which the most modern types of mechanism could be placed in the same building. The latest type would be the modern Fourdrinier paper machine.

How far could this lesson be carried? It would be possible

to-day to put logs of wood into one end of a factory and to take out from the other end a printed book, stitched and ready for the covers, without a single human hand touching the fabric of the paper from the beginning to the end of the process. Presently it will be possible, even if it is not already accomplished, to add a little annex to the building between the Fourdrinier machine on which the paper is made and the place in which the printing is done, where one might stand and dictate to a typewriter playing upon a machine, who would draw the melted type-metal into a matrix, casting the copy as fast as it could be dictated. The plates would then be put into the press, completing the work of making a book in a single, uninterrupted process.

The beginning of civilization has sometimes been fixed at the date, whenever it may have been, when man first set apart a lot of land, fenced it in or appropriated it, and then applied the force of a domesticated animal to his aid in the production of food. One can imagine how it was at the very beginning, when some one harnessed a bullock to a pointed stick, attached by a cord to the horns, beginning to plow. That primitive method of plowing still survives in some parts of the world. The fellahin of Egypt could be brought to an Exposition who still make use of the appliances of agriculture that are pictured upon the walls of the pyramids, and from the pointed stick which may be taken as an example of the beginning of civilization itself, the whole progress in the development of the mechanism of agriculture could be brought before the eye in one building. The last example might be a great, combined machine that has been applied by its inventor in the valley of the San Joaquin River of California to the production of wheat. By means of this mechanism the wheat field is plowed, harrowed, seeded, and rolled down in a single process. In the autumn the plows are detached, and a harvester worked by the same steam power is substituted—thrashing, winnowing, and putting the wheat into bags in a single operation. The cost of the labor of man which is applied to the direction of this mechanism is less than one dollar an acre in each year. The whole cost of the labor, aside from the maintenance of the capital, is less than four cents on a bushel of wheat. The product for three hundred days' labor of one man, corresponding to a year's work, has been in some seasons over fifteen thousand bushels. The wheat is carried to the seaboard, loaded upon steamships, and moved to London to feed the hungry workman of Great Britain, whose customary loaf, called the quartern loaf, weighs four pounds. There is

no coin in existence in Great Britain small enough to stand as a symbol of the labor cost or the proportionate part of the wages paid in California for producing wheat enough for that quartern loaf. There is but one coin in use in Great Britain, and that is seldom seen—the farthing—which would represent the cost of moving the wheat that is required in each quartern loaf from the field in California half way around the globe to the market in London.

If the plans which have been suggested are carried into effect, there will be in the next Exposition the natives of many lands, sheltered in tents or cabins of prehistoric type, which still suffice for their shelter where they now live. We may have an object-lesson in the tent of the Arab which has been developed into the Moorish type of architecture. The fellahin of Egypt, sheltered within walls made of clay bound with straw, may show how the Egyptian type of architecture developed itself in stone in the great ruins now to be seen, which are but fossilized types of straw bound with mud or clay. The prehistoric types of Greek and Roman buildings, from which the classic order have been developed, may also be shown. The materials and examples of the dwelling places of the Zuñi Indians, survivors of prehistoric races, will be brought before our eyes. The log hut in which the first European settlers in this country sheltered themselves was seen at Chicago, with specimens of aboriginal dwellings; but all this can be carried further.

Yet there were at our Exposition no true examples of American architecture, developed as other types have been in other countries consistently with the conditions of soil, of climate, and of the conditions of the country, because as yet no such national type of architecture exists in our land. A few examples of grand old colonial dwelling places still remain. They are solid, safe, and strong; copies of them formed a part of the Exhibition, giving a lesson in what is now a tendency to revert to a type of dwelling house which was, and is, more truly fitted to the conditions and needs of our temperate regions than any other that has been copied and introduced from abroad among us.

Grand buildings formed a part of the Exposition, but there was little, with the exception of the Forestry Building, which in itself formed an integral part of that which was exhibited within it. The modern factory and workshop are themselves part and parcel of the mechanism that is to be placed and operated within them—from which they can not be separated. A building corresponding to the Renaissance or to the classic orders in outward appearance

may serve as an inclosure in which machinery can be exhibited, but unless the machinery and building are planned together upon the same motive under one directing conception, neither machinery nor building can be considered a true type of the development of mechanism or its application to productive industry.

The art of working in iron and steel is another of which examples of the earliest known methods could now be brought from Africa, from Spain, and perhaps from other countries. Until a very recent time there still existed "Catalan" forges, so called, in some of the sparsely settled sections of our own country, where iron and steel were produced directly from the ores in a wayside furnace. On such a type, which might be established as marking the beginning, the whole development in the art of converting the ores of iron into the finest kinds of steel could be brought into view and illustrated by consecutive examples.

The art of preparing grain, especially its conversion into meal, might be illustrated by the present methods in use in Mexico, corresponding to the stone mortars and pestles of the mound-builders, in which, by slow and arduous manual labor flour is produced. From this beginning, the art of milling could be developed down to the latest method of reducing wheat to flour by the Cyclone Pulverizer.

In fact, it is difficult to name any art or process that has ever been established for providing for the material wants of mankind, either for clothing, food, or shelter, of which prehistoric types may not be found still in operation in some part of the world.

The development of industry proved to be the motive of a very considerable part of the Columbian Exposition. In the department of ethnology this was an important motive; and in this respect the entire Exposition became a marking point as compared to all that preceded or that may follow it.

All that has been is; all things have been others; all things will be others. Material life consists in the conversion of force. All that can be saved are time and labor. Nothing is constant but change. There is scarcely a type of capital in existence that was exhibited in the Columbian Exhibition in the form of machinery, tools, processes, that will not be displaced within a single generation by a more effective instrument or by one better suited to its purpose, or by some more durable and useful machine of its kind, or by some process in which less labor will be required than is now necessary in making provision for our material wants. Of

all the mechanism which was exhibited in the first World's Fair in London, in 1851, there could be found to-day scarcely a single example of those then in common use that would be worth more than its value in old metal. Hardly anything shown at the late Centennial Exhibition, in 1876, would now be constructed in the same way or at so high a cost; very few at so low a standard of efficiency as those which were constructed at that time.

In dealing with the progress of productive industry, one may say that "whatever is is right," because it represents all that we yet know of the highest type of mechanism; yet, one may also say with equal assurance that whatever is is *wrong*, because a shorter or less costly or a better method of attaining the same result will be discovered or invented to-morrow, or next week, or next year, or before many years have elapsed.

This proposition may perhaps be as true in its application to the existing relations of men in society as it is in its application to the mechanism and processes of the workman. In all prehistoric types of tools and implements we find simplicity; as each simple type is developed so as to become more effective, it also becomes by a long series of additions more complex and more costly in itself, yet less costly in ratio to the product attained by its use. In proportion to the increase and the additional effectiveness of capital, the absolute product of combined capital and labor is increased, the cost of production is diminished, and the wages of the workmen are augmented. When the maximum of complexity had been reached there is then apt to come a man who possesses mechanical genius or imagination as well as inventive power. He comprehends the central idea of each example of mechanism, he eliminates from it all that is unnecessary, and he thus develops a machine nearer to its original simplicity, but tenfold, a hundredfold, or even a thousandfold more effective in its application to material production.

The same rule holds in many other developments affecting our material welfare.

The modern dwelling-house is now passing through this complex stage. We may hope that this complexity has reached its maximum, therein corresponding to the confusion of modern life. Within these dwelling places we find a most elaborate system of apparatus for lighting, for heating, and for ventilating; the most intricate and costly methods of adornment. In fact, such is the complexity, that housekeeping may be defined as a system in which the house keeps the mistress rather than the mistress keeps

the house. People in vigorous health can live safely and comfortably in these houses, and may retain their health if proper attention is given to keeping all the various appliances in order; but when a man is ill with fever or any other ailment, it often proves to be better that he should be put into a tent and be sheltered in the simplest possible manner, in order to give him a fair chance of recovery. The art of living has reached that point when it may happen that a new social tendency will eliminate from our dwelling places all that is extraneous, so that we may perhaps bring life back again to its former simplicity and sincerity, but with far more comfort and less arduous work.

Reverting to prehistoric types of mechanism and of processes which have been developed in the past, it becomes apparent that all that has been invented or applied in recent years, complex as our recent methods may be, has yet been required in order to enable the great mass of people to exist at all, numbered in vast bodies and congested in many places as they now are. Yet, even with all that we have accomplished, the struggle for mere existence on the part of the great mass of population is still very severe.

It has been computed that before the territory which now constitutes the land of the United States (comprising three million square miles in area, without Alaska) had been appropriated, separated into lots and fenced in under individual possession—that is to say, while the land was common to all the Indian tribes then in the full possession of their natural rights—the number of inhabitants exceeded but little if at all the present computed number of existing Indian tribes, about three hundred thousand. Whether one can trust these statistics or not does not matter; suffice it that a far larger population had existed within the confines of our land in some far-distant past, but their number had diminished and was diminishing at the time of the first occupation of this continent by the race of men who have since developed modern invention and mechanism. Progress in productive industry has enabled our soil to support a great increase in population, which exists in comfort where a sparse population was fading away. This progress has consisted in the application of the sciences to productive industry. This development is from above, not from below. The truly civilized nations have reached the conception that the most rapid and surest progress will be made in material prosperity by that nation or state which attaches the greatest importance to the highest methods of training in the university.

The machine-using nations dominate the world, increasing their control and power the more they base their power upon service rather than upon warfare and force. "Thou shalt *serve* thy neighbor as thyself" is the true version of the golden rule, when the word *agapao* in the Greek text, which has been rendered by the word "love," is translated according to its true significance.

Industrial progress consists in the power of rendering service for service and of exchanging product for product—that is to say, in rendering each to the other that which is most conducive to the welfare of all. This exchange does not consist in a quantitative measure either of the product of labor itself or in the quality of that in which the exchange consists. The quality will be the highest, the labor cost the lowest, and the benefit will be greatest in respect to that state or nation in which a true education has been carried on to its farthest limit, and where it has culminated in a university at the very highest standard.

It has been remarked that the beginning of civilization may be attributed to the conception of private property, to the fencing in and appropriating land so that it may become an instrument of more and more abundant production as it is dealt with as a laboratory rather than as a mine. The whole population of this country, now over sixty-five million in number, could find standing-room in a single field so small that one person could communicate with all others by sight or even by sound. If every man of arms-bearing age, say thirteen million in number, were massed in one field, a space of three feet by two being assigned to each, a field containing three square miles would more than suffice to hold them; and such has been the development in many methods of signaling that orders could be given from the center so as to be seen or heard by every man in that vast assemblage. This is a visionary statement, to incite the imagination to a right method of dealing with land.

Practical progress in agriculture now consists in making use of the soil as an instrumentality or agency of production, rather than in withdrawing from it and expending its original elements of fertility. Many of our present methods of dealing with the soil as a mine that may be exhausted belong to a semibarbarous age, from which we have not yet in this country wholly emerged. In this, again, as in all other developments of productive industry it becomes apparent that the mind and not the hand of man is the prime factor in production. Manual and mechanical labor may

Typical American industries.—Norman Paper Mills, Holyoke, Massachusetts.

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be wasted in ignorant methods, until the laborer instructed from above by the students in the university may learn how to save half their effort and yet double their products. Many writers on the science that is called political economy have failed to take cognizance of the mental factor, even in dealing with the land itself. It may be admitted that, so long as production from land rests upon mere labor, what is called "the law of diminishing returns" must be the result. But, in point of fact, there is no such law, for the reason that no man can even yet measure the productive capacity of a single acre of land anywhere, because no man can tell how much can be taken off from land in the form of food until he knows the extent to which an acre of soil can be put to use in converting the elements that may be put into it or spread upon it into the products that may be taken from it. In the face of this conception of the true use of land the whole English or Ricardian theory of rent also falls, with all the fallacies that have been based upon it.

Great stores of phosphates which will be sufficient for our grain and cotton lands for centuries to come have already been discovered in the Carolinas and in Florida. Potash and lime can be supplied in almost any conceivable measure. There are vast sources of nitrogen, which is the most necessary and the most costly element in the nutrition of the soil, the beast, and of man alike, which are now going to waste. Beyond and most abundant of all, the atmosphere contains unlimited supplies of nitrogen. All that yet remains for science to do is to find out a right method for the quick and cheap conversion of the nitrogen of the atmosphere in combination with other elements of plant growth to the supply of food material. How to nourish the soil, next the plant, and then the man, and so on through the sequence of conversion, returning again to the soil without waste all that is required to nourish and support unnumbered generations of men, is the present problem. The student of natural history and the biologist have lately come to the aid of the chemist. Ere long the food problem of the world may in part be solved by merely giving direction to the bacteria and microbes which constitute the invisible and innumerable population of the air and of the soil; since it now appears that there are many plants to which these forms of animal life resort, where, living in the substance of the plant, they convert to its use the nitrogen of the atmosphere, where it may be assimilated and then turned under, renovating the soil which had been exhausted in the production of other

varieties of plant growth, and thus restoring the balance of Nature.

In finding out these laws and working with Nature will come the solution of the food problem for mankind. The first necessity of mankind is an abundant supply of food material. Strangely enough, the application of science to the nutrition of man seems to have been the latest problem that has been undertaken. We may fill a library with books instructing us in the right way of feeding beasts, but there is not yet a popular treatise in common use dealing with the right methods of feeding men, women, and children. As yet, only the alphabet of this science has been developed, and the simplest elements of the food problem are hardly yet known. The science of consumption will become the most important department in economic science, but as yet even the introduction has hardly been written.

How, then, are the more densely populated portions of the world nourished? What progress has been made in the art of providing food where but a small part can be supplied from the fields near the factory? That question leads directly to the applications of the mechanism of the arts that have been called productive and distributive; both words designating means which are applied to the same end.

Reference has been made to the earliest types of capital. What were they? First, cutting implements—axes, chisels, and the like; second, instruments of war and the chase, very serviceable for their purpose. One can readily imagine the superiority of the tribe that first invented the flint arrow or spearhead, as one can also imagine the superiority of the tribe that learned how to draw the bowstring with the two bent fingers holding the arrow between them, over the tribe that had only learned to grasp the arrow with the finger and thumb without the power of the bent fingers over the bowstring.

It is apparent that from the beginning the hand of every man, then of every family, then of every tribe, was against the next. Each tribe wandering over a great district, wholly dependent upon the gratuities of Nature for subsistence, could have little, if any, conception of the idea of mutual service. Food could be kept but a short time, the pressure of want was constant; each sought to take by force from the other what seemed to be a more abundant share than he himself possessed. One can imagine how society developed through all the ages after the first plot of ground was appropriated and the first beast of the field harnessed

to the plow. Then came the change which the invention of gunpowder rendered possible, establishing equality among men without regard to individual force, making the potential of mind rather than of body the test of leadership; while in the application of gunpowder to mining was laid the foundation of modern civilization, so far as it rests on the use of metal.

Slowly but surely this equalization of physical force and supremacy in leadership only in proportion to mental power has destroyed feudalism and has done away with privilege; ere long, dynasties must be wholly removed from the face of society under its influence. They can not stand much longer in the way of mutual service and of mental and material progress. In every country in which the present inhabitants have a long and continuous history, privilege and class distinction still stand to some extent in the way of mutual service; but one can readily imagine or forecast the time when all this obstruction will cease.

In every country, with the exception of the United States, the military service has been and still is held, wittingly or unwittingly, in the highest honor; yet the relative prosperity or poverty of different nations may be surely measured by the presence or absence of the military uniform in town, city, or state.

In the United States we have almost reached that state of progress when the mass of men wonder a little why any capable young man should choose to devote himself to preparation for service either in the army or in the navy. Many who *do* enter the service soon find out that they have made an error, and attain their true position by resignation. Others, men of capacity and ability, held by a sense of duty in consideration of what they have gained in their education, remain and still find a true place, although a limited one, in the performance of their duty. In England the case is a little different; yet in recent years the men who are of the highest type of intelligence have ceased to enter either the military or naval service, except in emergencies. The pursuits of peace—commerce, manufacturing, and transportation by sea and by land—now open careers to men of the highest ability in both branches of the English-speaking people. Supremacy in these pursuits now leads to higher estimation and honor than the ordinary occupations of the army and of the navy.

Of course, in dealing with the military position as one of honor, exception must be made in the present generation in respect to the men of our own land who left the pursuits of peace in order that by service in the army and the navy they might main-

tain the existence of the country itself. As soon, however, as the passive war of slavery had culminated in the active war by which it destroyed itself, the pursuits of peace again commanded the highest ability among those who will again, in time of an emergency, be capable of the defense of the nation against all outward hazard.

With respect to hazard from without, it now seems probable that the methods of defense will ere long be such as to require the service of the scientist rather than of the soldier. It begins to be apparent that the time is not far off when a weapon of defense rightly placed upon the land will render it impossible for any ship of war of any kind to approach our shores. Already it would appear that the huge battle ships on which such great sums of money have been wasted in foreign countries have become so complex in all their parts, that even in a peaceful review, in which their guns are fired, they become incapable of offense until they can be repaired, or until the delicate mechanism can be restored to its normal condition. The landing of an army upon our shore has ceased to be a possibility.

Within our own country, our continental system of free trade, all rendering service for service each to the other, makes war impossible, and relegates our army to the condition of a national police. As we extend our services and hold out the benefits of free trade to other countries, the very conception of war with us will become as grotesque as it will be futile.

As we trace the progress of modern industry, we find that down to a period of a little more than a century since, the supremacy of nations, each with respect to the other, rested more upon the control of the sea than upon any other conditions. That nation which possessed the greatest aptitude for navigating the water ways of the ocean held for a long period supremacy in the pursuits of commerce, not only by lawful methods but also in that kind of war which savors more of piracy than anything else, commonly called privateering. Through commerce these nations took the lead in art and industry. It was not until the application of the power of steam and the development of the modern processes of mining iron and steel, a little more than a century ago, that the great change occurred which has enabled the English-speaking people to dominate the world. Whether or not this power of dominion will lead to peace, good will, and plenty in the near future, or to devastating war, depends mainly upon the future policy of the English-speaking people in Great Britain, her

colonies, and the United States. It does *not* depend upon their power to organize a great army with which to compel submission to themselves. Whether recognized or not, in every war of modern if not in ancient times the controlling element on which the issue of the struggle mainly rested has been the commissariat. The best-fed soldier has won the victory on land, the best nourished sailor upon the sea. The victory of the Dutch over the Spaniards was due to their command over the sea and to the freedom of their commerce. In the Napoleonic wars the main issue was commercial. It was a struggle of nations for the sole control of commerce. Bearing in mind the Berlin and Milan Decrees of Napoleon, the Orders in Council of the British Government, and the later incidents of the Embargo and the Nonintercourse Act of the United States, it becomes apparent that the commercial idea has been the dominant one in all the great struggles of the present century.

One may wonder what the modern history of Europe would have been had Napoleon been strong enough to establish free trade with all the world. France would have been spared the restoration of the Bourbons, and all the dark chapters that succeeded. England, under the leadership of Pitt, would have rivaled Napoleon in the development of commerce; and the huge European national debts, which can never be paid but must some time in great measure be repudiated, would never have been piled up.

It may be assumed without question that the French, under Napoleon, parted with their control of the Louisiana territory and thus gave absolute domination to the English-speaking people of the United States from the Atlantic to the Pacific and from the Gulf of Mexico to the confines of Oregon, not from any good will toward us, but lest the English-speaking people of Great Britain should, by attaining that dominion, become more and more capable of controlling every sea, and thus absorbing the commerce of the world to herself. What was it that gave to Great Britain her strength to compel even Napoleon, at the height of his power, to part with this territory, and thus to give that rich country, covering one half of a continent, to ourselves?

Within the limits of the Louisiana purchase, itself constituting but a part of our national domain, there will exist a more prosperous, numerous, and more powerful body of people than will dwell within either the limits of France or of Great Britain at a period perhaps not more than one hundred years from the date of the occupation of the Louisiana territory by the people of the

United States. Was it not the possession for nearly a century of the principal mines of iron ore and coal, which constituted the chief source of the iron and steel of the world, that made Great Britain what she is to-day? Has it not been the development of machinery in advance of other nations that has enabled Great Britain to buy more than one half of the food on which her people are sustained in exchange for the goods and wares that she sends to the farthest corner of the earth? Is it not due to her mechanical energy that she has become the great creditor nation of the world? But the time has arrived, even within the present generation, when through the widening influence of science and invention Great Britain has ceased to be the principal machine-using nation of the world: this is, however, merely a nominal, not a real, change. The English-speaking people of Great Britain and her colonies, with the people of the United States, still retain that supremacy. How will they use it? That is the question which it lies with us to solve.

The application of machinery to productive industry may be separated into two parts: that which is intensive and that which is extensive. On the one side we have the great factory and workshop, in which what are called the intensive or collective methods of industry are carried on by great numbers of people who work together by division of labor in making the final product. On the other hand, we have the railway and the steamship, extending the mechanism of distribution so that the whole world has become a neighborhood.

Mr. Chauncey Smith has stated this problem in words to which nothing can be added and from which not one can be taken: "The work which a people can perform is equal to the sum of the forces or energies they can command or exert, less the resistance or obstacles which surround them or which they must encounter."

The forces or energies which are applied to material processes may be broadly put into two classes: intensive and extensive. Intensive forces are applied in the primary processes of production; extensive forces in overcoming the obstacles to distribution. What I have named the intensive form of energy was first developed in greatest measure in Great Britain. The working of iron —the discovery of the process of smelting iron ores with coal—the application of the hot blast to the iron furnace, and the subsequent development of steam, rendered the factory system a possibility. To these intensive forces was soon added the invention of illuminating gas. Coincidently, or a little later, came the invention of

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Typical American industries.—Gorham Manufacturing Company (silverware), Providence, Rhode Island.

the turbine wheel and the ready application of water power. All these forces are distinctively intensive in their influences: they bring together great bodies of working people in very narrow areas, developing some adverse conditions of life in connection with many benefits, and working very profound changes in the organization of society.

It was not until the application of steam power upon the railway and in the steamship that the effect of this concentration began to be qualified by the application of the same forms of energy to diffusion or distribution. Neither the energy of steam nor of a fall of water, nor the influence of illuminating gas, could be spread over a wide area of productive industry. The application of these inventions led to the intensive, collective, or factory system, and to the division of labor, and to other changes from which many evils arose; but these evils were perhaps no greater than those which had previously existed in household industry; as they became more conspicuous they were more easily eliminated.

We can not yet even begin to forecast the influence of that form of energy which we have named electricity in counteracting the intensive effect of former forces. In one instance a contract has already been made by the authorities of the city of St. Étienne, in France, to carry a wire from a central electric station to each one of the five thousand hand looms that have heretofore been operated in the dwelling-houses of the workmen. These looms have been applied to the finest kinds of silk ribbons. The substitution of electric power for other forms of energy will convert the work of the house into something like that of the factory. One can already foresee the time when a very large portion of the processes of industry which have heretofore been carried on in the most crowded portions of cities, where power, heat, and light could be most cheaply attained, will be spread over a very much larger area, where the working people can dwell under very much better conditions when they have power, heat, and light on tap at the touch of a button in the wall, and when the manager or owner can give the necessary directions from the heart of a neighboring city. One may now venture to measure the productive energy of different nations and their power to benefit their fellows through commerce by a somewhat rough and ready computation of the population of the several sections of the earth's surface, and by classifying them according to their control over natural resources and their power of developing mechanism to the saving of human

labor. Nations or states may be sorted in a broad and general way into three classes:

1. Those which apply mechanical forces to the production of goods and wares in excess of their own wants.

2. Those states or nations which have applied mechanism to the supply of a part or the whole of the machine-made goods and wares that they require for their own consumption, and no more.

3. Those states or nations in which the intensive mechanism of the factory and of the workshop have not been applied to productive purposes in any considerable measure, but which are capable of supplying the machine-using nations with the crude or hand-made fabrics for conversion into their finished forms upon the machines that are contained in the factory or workshop.

Commerce consists in this exchange of services and of products, and in this exchange the extensive application of mechanical forces has profoundly changed the conditions of the world.

The first development, or the conversion of the power of coal into work in the steam engine and in the smelting furnace, began in Great Britain. For a long time the authorities of the land endeavored to keep their processes secret, both in the furnace and in the construction of machinery for the factory, and penal laws forbade the export of machinery. The first types of machinery for printing calicoes that were introduced into Lowell were obtained with the greatest difficulty, and perhaps with considerable danger to the agents who were sent abroad to secure them. This difficulty continued until the general change in the protective features of British legislation between 1824 and 1853. The greater part of the noted Report on Manufactures, by Alexander Hamilton, which was presented to Congress in 1791, is devoted to dealing with the difficulty in obtaining machinery and a knowledge of processes, and to overcoming the advantages assumed to be given to foreign manufacturers by export duties, bounties, and special privileges in the application of machinery.

The supremacy of Great Britain in many arts continued until a very recent period. At the present time, however, all the former obstructions to the sale of machinery and its shipment anywhere have been removed. Each and every nation and state can now avail itself of every invention, subject either to royalties temporarily granted under patent rights, or to the difficulty of attaining the peculiar aptitude of those who, through a long process of development, have become skilled in the operation of the work.

In the first division of the machine-using nations, the combined

population of the United States and Canada now numbers 70,000,000 in round figures, most fully endowed with coal and iron.

In the same division of machine-using nations comes the kingdom of Great Britain and Ireland, numbering 37,500,000. They are endowed with coal in considerable abundance, of which the supply suitable for making coke at moderate cost is approaching exhaustion. They possess a large quantity of iron ores somewhat deficient in variety, and are therefore dependent upon distant points for a portion of the finer ores required for the manufacturer's supply. They possess a very moderate area of good soil, and are dependent upon other countries for more than one half of the necessary food supply.

In the second division, third in efficiency, we may deal with France and Belgium, endowed with good land, capable of producing a small excess of food in a favorable season, deficient in timber, with a fair supply of ores of iron and coal, both, however, insufficient for domestic consumption. Population a little over 45,000,000.

In the second division, fourth in the list, we may put the empire of Germany and the Netherlands, perhaps including Denmark; endowed with a small area of good soil and a large area of poor quality, deficient in food supply, and subject to a great scarcity in a bad season; deficient in timber; possessing a limited supply of coal, but endowed with a moderate supply of ore of iron of low grade, which has been lately rendered valuable by the advances in science in their treatment; the total population a little more than 50,000,000.

Class I consists of these four groups of states, numbering in all about 200,000,000 people. In this class are to be found all the machine-using nations which have applied modern mechanism to production in any considerable measure beyond the supply of their own wants. It is among these nations or states that competition now exists for supplying the world with what are commonly called manufactured goods, in distinction from the products of manual labor and from the special product of the craftsman by whom ingenious hand tools rather than self-operating machinery have been applied.

Within this small limit of about one seventh part of the computed population of the globe is to be found the only effective application of modern science and invention under the intensive or factory system.

Russia, Norway, and Sweden may be assigned to Class II, as

nations which are beginning to apply modern mechanism and the intensive system to the arts, but which have as yet made no considerable progress; their exports of manufactured goods to other countries are insignificant, except that Russia through her dominion over tribes subject to her sole control in Asia has secured their trade. The population of this group numbers in round figures 100,000,000.

In this Class II we may also include Italy, Austria-Hungary, Spain, and Portugal. These states may not be counted as effective competitors in the application of machinery to the arts except for the supply of their own people with manufactures. Turkey in Europe might be added to this group, the population of all numbering in round figures 100,000,000.

We find in Class I a population a little exceeding 200,000,000; in Class II a population almost exactly numbering 200,000,000.

There remain in Class III the people of Asia, Africa, Australasia, South America, Central America, and Mexico, computed to contain a population exceeding 1,000,000,000 in number, who have not yet applied modern machinery upon the intensive system in any considerable measure, whose resources are only beginning to be developed by the extension of the railway and of the steamship.

These continents, nations, and states in Class III are endowed with practically unlimited power in supplying the crude materials, tropical articles of food, and almost every product of the field, the forest, and the mine in response to any demand; exchanging with the machine-using nations, by whom the crude materials will be converted into the finished fabrics of the factory and of the workshop. The people of these nonmachine-using countries will give a product of ten, twenty, or even in some cases one hundred days of handwork in exchange for manufactured goods and wares made in the modern factory and workshop by the application of a single day's work of one man yet in such exchange all are profited.

It will be remarked that commerce consists in the exchange of the products of labor without regard to the time required in each branch of the work. Effectiveness of labor gives to the machine-using nations the advantage in saving time and in diminishing the effort which must be applied to produce any given result. Yet in all commerce among men and nations each gains, and the benefit is mutual.

Dealing with the world as a whole under the foregoing classi-

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fications, we may now put first, among those who apply mechanical forces in the production of goods, wares, and products of almost every kind, the people of the United States, now numbering about 66,500,000. The Dominion of Canada may be classed with this country, in view of the certainty that within a very short period the barriers to mutual service which now separate the two states will be removed. Each is the complement of the other; each furnishes in part the crude material that the other needs. Classing the United States and Canada together, occupying nearly the whole continent, it may be observed that the English-speaking people of this vast domain will constitute the only great nation producing a large excess of every kind of food that is essential to the support of life. Within their territory are found the largest known deposits of coal, of iron ore, of copper ore, and of nearly all useful metals. Their product of the so-called precious metals is also large as compared with that of other countries, although relatively to all their other products insignificant in itself. There would probably have been less confusion in the financial conduct of the United States had there not been a mine either of gold or of silver within the limits of the country, and the country as a whole would doubtless have been much better off. The United States and Canada possess the greatest body of useful timber that is accessible, the most available deposits of petroleum, and, last but not least, perhaps the most important of all their natural resources, great stores of mineral phosphates which will assure for a practically unlimited period a full supply of phosphoric acid for the maintenance of the grain and cotton fields of the country.

The benefits of commerce bring into most conspicuous notice the principle quoted from Mr. Chauncey Smith, namely, "the work which the people of any country can perform is equal to the sum of the forces or energy which they can command"; their power to render service to other nations is due not only to the force which they apply directly to the production of their goods and wares, but also to their power of overcoming the resistances or the obstacles which surround them.

As an example of both methods of the application of energy in each direction the railway may be cited. The power of the locomotive is exerted to draw the train, but the power of the engineer had been previously exerted to overcome the resistance and to lay down the ways of commerce.

It is curious to remark that, aside from a few ruined buildings

and works of art, all that remains of a tangible kind of the great Roman Empire is the Roman road and the Roman aqueduct. The Romans first opened the ways of commerce upon the land, and the opening of these ways is the only permanent record that the Roman Empire has left behind, except the Roman civil law which lies at the foundation of modern society.

The dominion of peace, order, and industry rests upon coal, iron, and gunpowder. In the application of iron to the railway the United States leads all nations, possessing almost one half the total mileage of the world. Few persons ever think that, in order that the people of this country may move on their customary way and may continue their present modes of life, it has been necessary that eleven tons of food, fuel, fabrics, and fibers should be moved over our railways one hundred and thirteen miles in each year on the average for every man, woman, and child in our population. Even this statement conveys but little meaning. Perhaps it can be made plainer. Disregarding fractions, the total movement of freight by railways now amounts to seven hundred and thirty million tons moved one hundred and twelve miles in each year. That comes to two million tons a day, including Sundays. It may be assumed that a span of horses can draw two tons by wagon over a common roadway a distance of sixteen miles a day; each two tons which is moved by the railway would require seven spans of horses to cover the whole distance. At that ratio, the number of horses that would be needed to do the work that is now done by the railways, at a cost of ten dollars and fifty cents to each person, would be fourteen million. If it were the function of the government to provide work for the unemployed this might be done effectually by taking up the rails; in that way the business of making harnesses and wagons would be developed, the removal of the rails would afford occupation, the care of the horses would benefit stablemen and drivers, men would be wanted to keep the roadways in repair, and in a great many other ways domestic industry would be promoted, the home market would be developed, and home labor would be employed in a manner that no other obstruction to mutual service could possibly bring about. Why not take up the rails?

When railways were first introduced it was believed that the work of horses would be displaced; it must now be remembered that nearly all this freight has to be carried to the railway and to be carried away from it by horse power.

While we have smoothed the way by bringing energy to bear

upon the movement of goods and removing the obstructions to such service on our railways, our common roadways remain about as they have been for a generation. They are bad in design, bad in construction, wasteful in cost; they are almost useless through a great part of the year in every section and in every part of the state.

Attention may now be called to a singular fact when viewed in the light of science: each empire, each nation, each country, and, in Europe, each separate state, is striving to make the most effective application of science and invention to production and distribution. All endeavor to bring the forces which are at their command to bear upon the production of useful things. Each tries to overcome the natural obstructions that retard distribution by bridging the rivers, tunneling the mountains, and filling up the valleys. Each state, having accomplished everything in its power—first, in the increase of its product with a constant lessening of the work; second, in overcoming the natural restrictions and obstructions to mutual service—then erects at the border line that separates one country from another a barrier more difficult to surmount than any natural obstruction yet overcome. Each attempts to prevent mutual service and to destroy the interdependence of nations by taxing their products at the point of import.

It may, however, be remarked that there is a little progress in a new direction. The Zollverein treaty of commerce between the states that now constitute the German Empire laid the foundations for the consolidation of that empire. Within a short time the Dreibund treaty between the German Empire, the Austrian Empire, and Italy, has to some extent removed the barriers to mutual service among the people of these countries. More remains to be accomplished. The armies of Europe in active service at the present time number four million men; they are maintained at an annual cost of one billion dollars, to sustain privileges which are no longer based upon mutual service, and in order to maintain these tariff barriers at which the revenue collected is much less than the cost of the armies which maintain them.

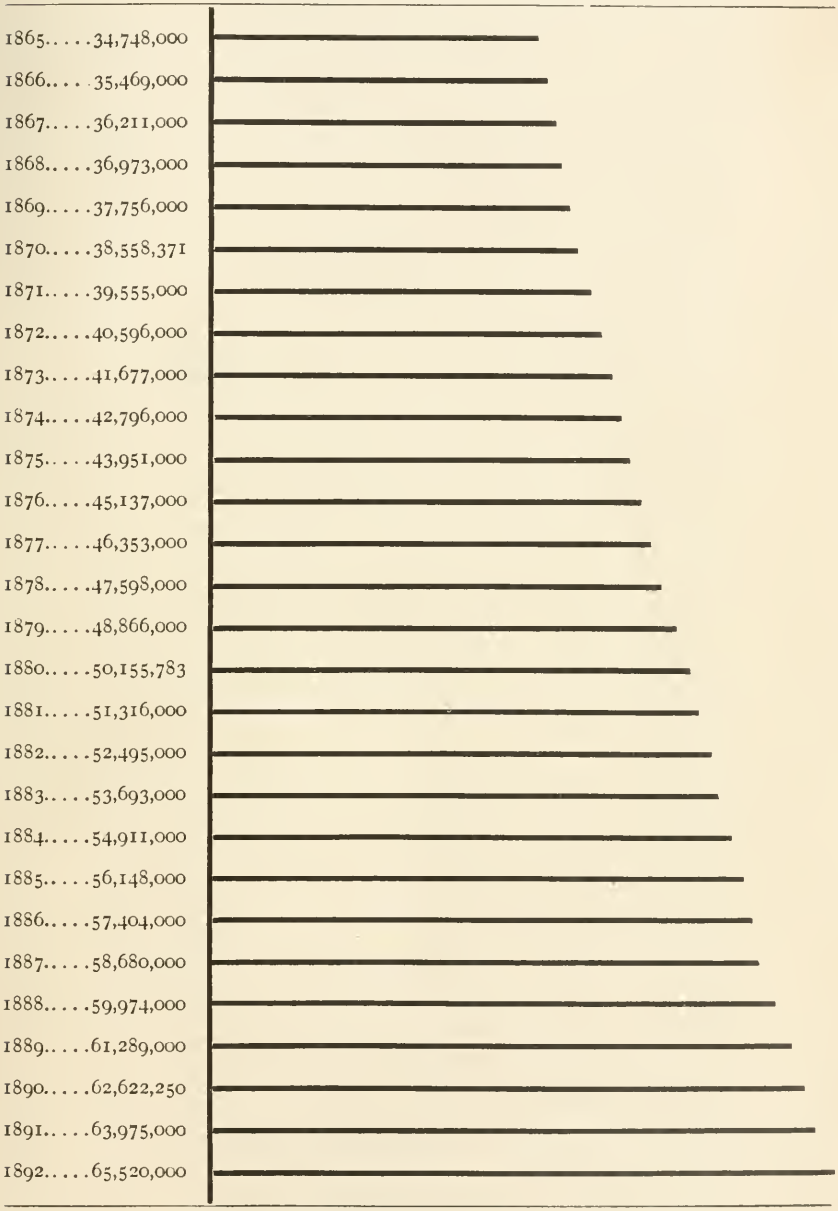
The days of privilege and militarism may be numbered. Who can tell how the end will come? The people of this country are at the parting of the ways, and may soon give an example to the world of what may be accomplished when the interdependence of nations has opened the ways of commerce to all who would enter thereon.

It remains to give some object-lessons in the development of productive industry. In these examples I shall deal only with the principal elements of material welfare—food, fuel, fibers, and iron —and with the mechnaism of distribution. The conclusion to which one must be led by the consideration of these object-lessons and the summary which I have made of them is this: In a single generation, during which a destructive civil war has occurred—this very war itself opening the way to the greatest progress throughout one half of our common country—the productive energy of the people of this country has been enabled, through the applications of science and invention, to more than double the general product with less effort and lessening hours of labor than had been required on the part of those who preceded us. The effect of such revolutionary changes as have occurred in this period is, first, to lead to great private fortunes; second, to improve the conditions of those who are well off or who possess special skill and aptitude. The first benefits are enjoyed in greater measure by these classes than by common laborers or ordinary workmen. In some cases an adverse influence is for a time felt by merely manual laborers who are no longer required to do the work in which they have been displaced by machinery. Hence, every period of great progress is also a period of discontent, gradually abating as the benefits filter down and are spread throughout the whole community.

This process is one that is never-ending, and is always beginning with each new development of science. The figures and the lines which will be subsequently given are but the milestones by the way marking the points to which science and invention have yet brought us. He would be a rash person who would even now undertake to forecast the future or attempt to deal with the elements of progress, in which science has as yet made but a beginning.

All that we have accomplished is but a shadow of what will be; all that was put before the eye in the great Columbian Exposition will fade away like a dream. A few years hence nothing will remain of that which has been exhibited within its buildings; but the great university, which the people of Chicago have so wisely founded, will take up the work where the Exposition has left it, and will carry it on through unnumbered generations.

Population of the United States.



Increase in population, 1865 to 1892, $88\frac{56}{100}$ per centum.

The Price of Personal Liberty.

The expenditures of the United States from January 1, 1861, to June 30, 1868, seven years and a half of civil war and reconstruction, amounted to	$4,700,000,000
The expenditures of peace would have been	700,000,000
War expenditures	4,000,000,000
Interest paid on the national debt to June 30, 1892	1,950,000,000
Pensions paid to June 30, 1892	1,580,000,000
War expenditures to June 30, 1892	7,530,000,000
Pension roll and back pensions from June 30, 1892, to December 31, 1894, when it is believed that all claims under existing acts will have been audited	320,000,000
Interest to be paid until final liquidation of the national debt, not less than	150,000,000
Total without pensions beyond December 31, 1894	8,000,000,000
The future disbursements for pensions should be computed by an actuary. A part of the pensioners are old soldiers of the Mexican War; a part are widows and children. One of these classes may counterbalance the other. The great body of the pensioners served in the civil war.	
The number on the roll, December 31, 1894, will be, by computation of the late commissioner, 1,172,000. Their average age will not be far from sixty years.	
According to combined experience tables on unselected lives, that number of persons, at the average pension granted, would draw from the Treasury between 1894 and 1920 the gross sum of $2,182,000,000, and there would remain on the roll in 1920 over 100,000 names.	
Making a moderate allowance for impaired lives, the sum yet to be paid to pensioners under existing acts will be not less than	2,000,000,000
Total	$10,000,000,000

The price paid in money for personal liberty in these United States will have been not less than $10,000,000,000, to which may be added the expenditures of the South in the futile attempt to make slavery national and liberty sectional.

All but a tithe of this sum will have been paid within the limit of a single generation. The average value of each year's product in that generation will have exceeded this sum.

Liberty has been established at a cost in money equal to one year's work in thirty-five. The lives were given—they were priceless.

Typical American industries.—Merrick Thread Company, Holyoke, Massachusetts.

Increase and Decrease of the Burden of National Taxation in the United States, measured by the Net Ordinary Receipts from Duties, Sales of Public Lands, and Internal Revenue, per capita.

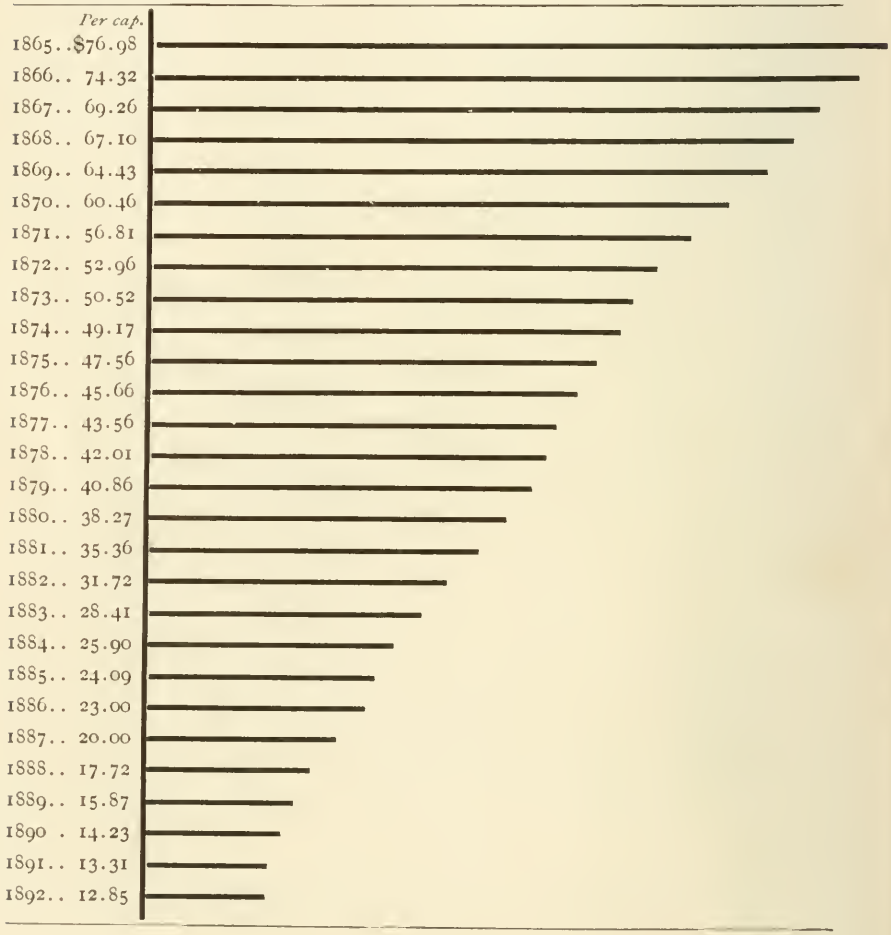
This table indicates that the gain in population more than compensates for the increasing charge, including pensions. A more rapid reduction per capita may soon be expected.

Reduction of the National Debt of the United States computed per capita.

The maximum debt of the United States in 1865 was in fact $84.00. There were then several hundred million dollars due for back pay to the army and upon contracts, which had not been audited and entered upon the books of the Treasury, from which this table is made.

The net debt by the books in 1892 appears to have been only $12.85, as against $76.98 in 1865, showing an apparent reduction of 83 per centum, or a greater burden then than now about fivefold per capita.

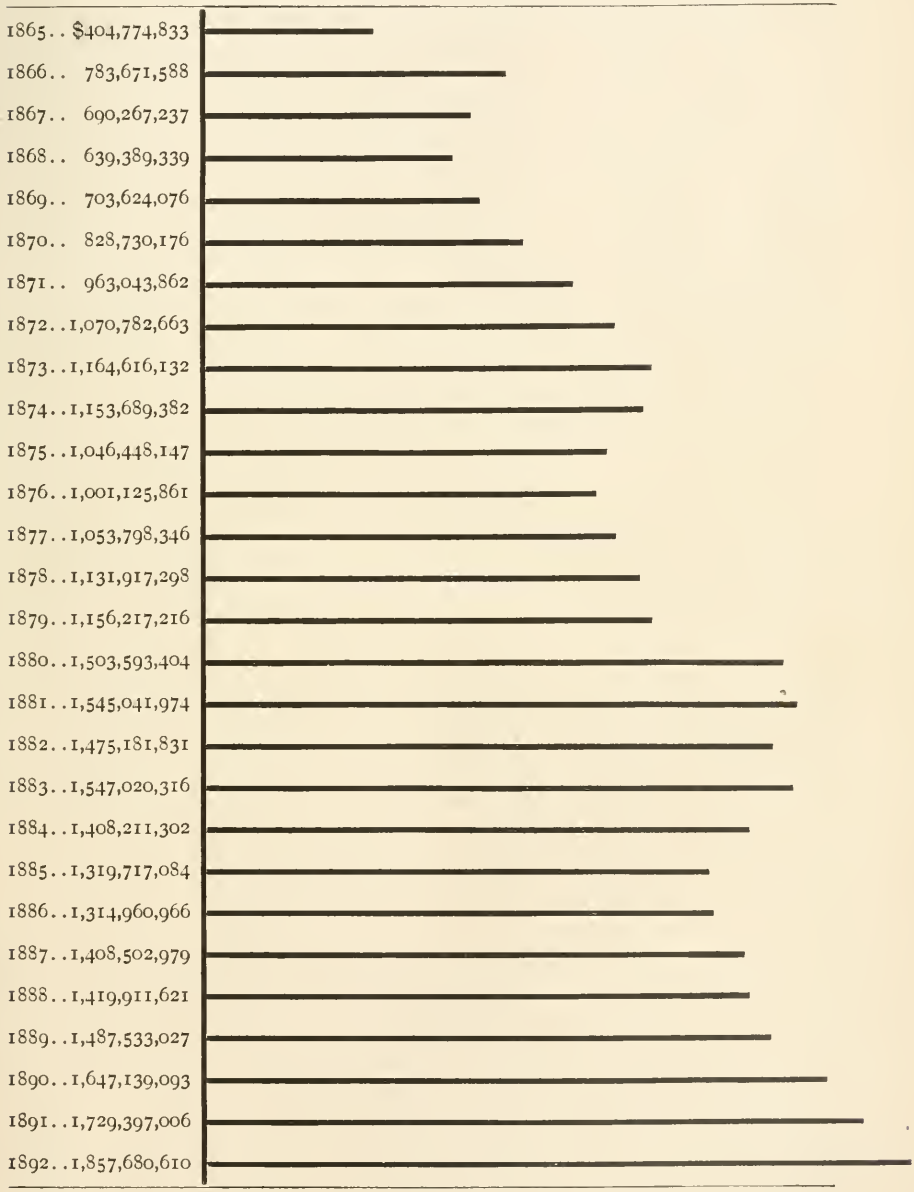
This very favorable statement must, however, be somewhat qualified. Under the provision of law by which the notes of the Government are made a legal tender, the Government has lately made a forced loan from the people to the amount of about $500,000,000. The proceeds of this forced loan have been expended in the purchase of silver bullion, which now lies in the Treasury vaults, and is not worth as much as it cost by about $100,000,000. The final loss on this transaction must be added to the debt. It can not now be measured.



Imports and Exports of the United States.

The continuance of the war tariff and its increase, obstructing both imports and exports, can not fail to have rendered our progress in international commerce much less than it would otherwise have been.

MERCHANDISE ONLY.



Increase 1865 to 1868 inclusive as compared to 1889 to 1892 inclusive, 167 per centum.

National Taxation and Expenditures of the United States since the Resumption of Specie Payments, January 1, 1879, fourteen years.

	REVENUE.			EXPENDITURE.	
Year.	Population.	Amount.	Per head.	Amount.	Per head.
1879	48,866,000	$272,322,137	$5.56	$266,947,883	$5.46
1880	50,155,783	333,526,501	6.67	264,847,637	5.28
1881	51,316,000	360,782,292	7.03	259,651,639	5.06
1882	52,495,000	403,525,250	7.69	257,981,439	4.91
1883	53,693,000	398,287,582	7.42	265,408,138	4.95
1884	54,911,000	348,519,870	6.34	244,126,244	4.44
1885	56,148,000	323,690,706	5.78	260,226,935	4.63
1886	57,404,000	336,439,727	5.86	242,483,138	4.23
1887	58,680,000	371,403,278	6.32	267,932,180	4.56
1888	59,974,000	379,266,075	6.32	259,653,959	4.33
1889	61,289,000	387,050,059	6.24	281,996,616	4.60
1890	62,622,250	403,080,983	6.44	297,736,487	4.69
1891	63,975,000	392,612,447	6.13	353,372,684	5.55
1892	65,520,000	353,937,784	5.42	345,023,330	5.27
		$5,064,444,691	$6.35	$3,869,388,309	$4.85

Special Sources of Revenue from the Taxation of Spirits, Beer, and Wine, Tobacco — Domestic and Imported.

Special Expenditures for the Cost of Government, Civil Service, Army, Navy, Public Works, Rivers, and Harbors, omitting Interest and Pensions.

Year.	Amount.	Per head.	Amount.	Per head.
1879	$112,752,284	$2.31	$126,498,452	$2.59
1880	123,750,605	2.47	112,312,888	2.24
1881	135,028,455	2.63	127,083,618	2.47
1882	146,603,931	2.79	125,559,039	2.39
1883	150,288,620	2.80	140,235,433	2.62
1884	134,262,278	2.44	134,118,638	2.44
1885	126,662,012	2.26	152,738,411	2.72
1886	132,181,621	2.31	128,498,128	2.24
1887	134,389,577	2.29	145,161,501	2.47
1888	140,691,047	2.34	134,650,442	2.25
1889	148,883,789	2.43	153,370,352	2.50
1890	163,485,350	2.61	154,700,347	2.43
1891	170,372,969	2.66	193,409,598	3.02
1892	171,875,388	2.63	187,062,162	2.85
	$1,991,227,926	$2.50	$2,015,399,008	$2.53

The consumption of spirits is slowly lessening; the increasing revenue from liquors is derived from the very rapidly increasing consumption of light beer. When the interest ceases by payment of debt, and the pensions fall in, a well-adjusted system of taxation upon liquors and tobacco will suffice for the entire support of the Government.

National Taxation and Expenditures of the United States since the Resumption of Specie Payments, January 1, 1879, fourteen years.

Year.	REVENUE FROM OTHER SOURCES THAN LIQUORS AND TOBACCO. Miscellaneous receipts.	Per head.	Customs revenue.	Per head.	Total per h.	EXPENDITURES FOR INTEREST AND PENSIONS ONLY. Interest and pensions.	Per head.
1879..	$20,565,697	.42	$138,984,156	$2.30	$2.72	$140,449,431	$2.87
1880..	21,978,825	.45	187,797,371	2.47	2.92	152,534,749	3.04
1881..	25,154,851	.49	200,598,986	2.63	3.12	132,568,021	2.59
1882..	31,703,643	.60	225,217,676	4.30	4.90	132,422,401	2.52
1883..	30,796,695	.57	217,202,267	4.05	4.62	125,172,705	2.33
1884..	21,984,882	.40	192,272,710	2.44	2.84	110,007,607	2.00
1885..	24,014,055	.43	173,014,639	3.09	3.52	107,488,524	1.91
1886..	20,989,528	.36	183,268,578	3.19	3.45	113,985,010	1.99
1887..	26,005,815	.44	211,007,886	3.59	4.03	122,770,679	2.09
1888..	24,674,446	.41	213,900,582	3.57	3.98	125,003,516	2.08
1889..	24,297,151	.38	213,869,119	3.45	3.83	128,626,263	2.10
1890..	24,447,420	.39	215,148,213	3.44	3.83	143,036,139	2.26
1891..	23,374,457	.36	198,865,021	2.66	3.02	161,963,087	2.53
1892..	27,403,993	.42	154,658,403	2.37	2.79	157,961,169	2.42
	$347,411,158	.43	$2,725,805,607	$3.42	$3.85	$1,853,989,301	$2.32

RECAPITULATION.

			CENTS PER HEAD PER WORKING DAY.
REVENUE.			
From liquors and tobacco	$1,991,227,926	$2.50	.8333
From miscellaneous sources....	347,411,158	.43	.1433
From all other taxes.	2,725,805,607	3.42	1.1400
Total.....	$5,064,444,691	$6.35	2.1166 cts.
EXPENDITURES.			
For cost of government	$2,015,399,308	$2.53	.8433
For interest.....	800,858,989	1.00	.3333
For pensions.....	1,053,130,312	1.32	.44
For payment of debt.....	1,195,056,382	1.50	.50
	$5,064,444,691	$6.35	2.1166 cts.

Postal Receipts of the United States.

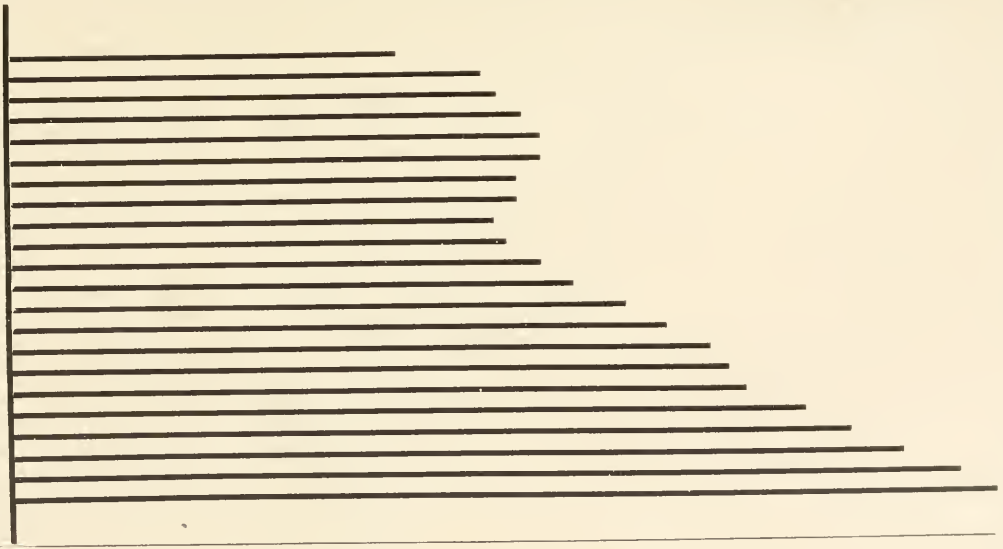
It would be difficult to find a better standard of true progress in general welfare than the increase in the service of the post office measured by its income.

Increase, 1865 to 1892, 387 per centum.

The True Standing Army of the United States.

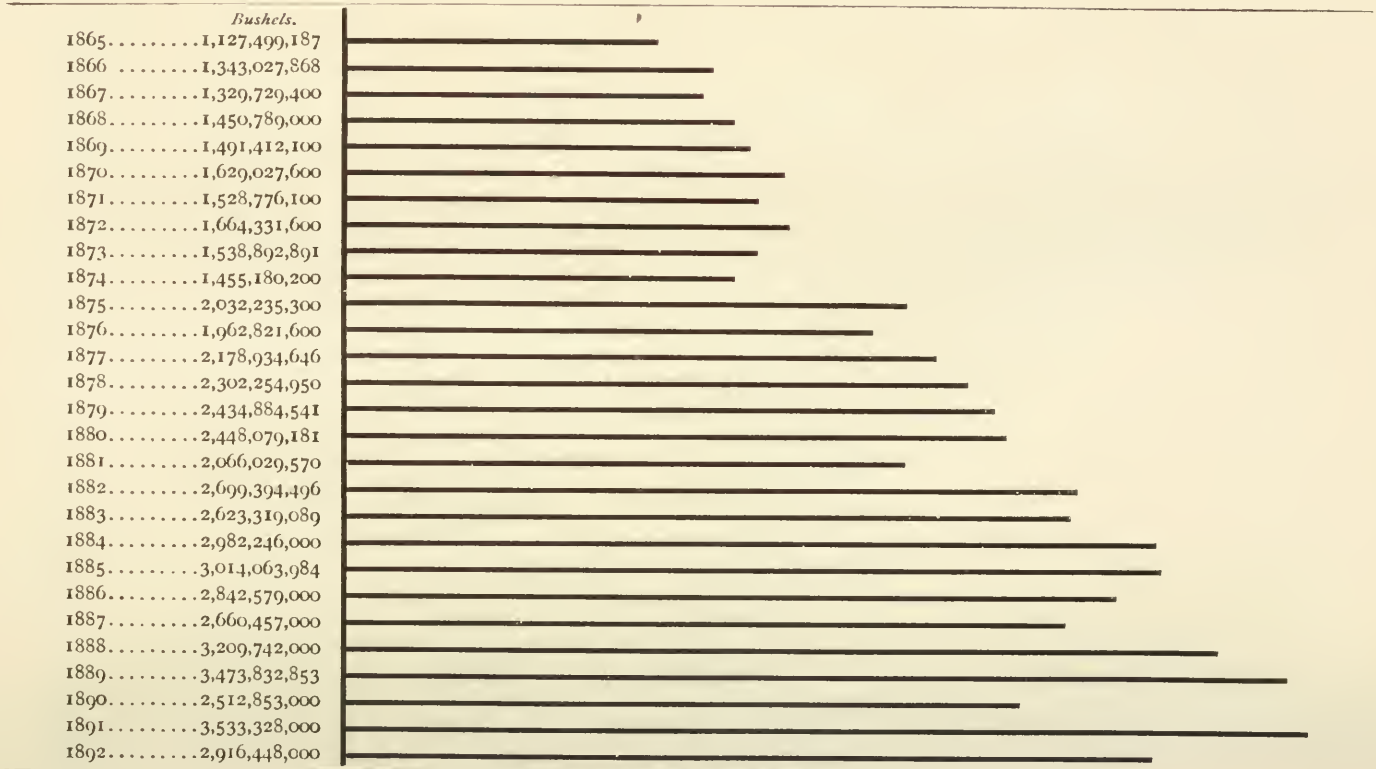
TEACHERS IN THE COMMON SCHOOLS AND APPROPRIATIONS THERETO.

	Number of teachers.	Appropriations.
1871	220,225	$60,107,612
1872	229,921	74,234,476
1873	237,513	76,238,464
1874	248,447	80,054,286
1875	257,865	83,504,007
1876	259,618	83,082,578
1877	267,050	79,439,826
1878	277,147	79,083,260
1879	280,330	76,192,375
1880	286,593	78,094,687
1881	293,860	83,642,964
1882	299,079	88,990,466
1883	304,389	96,750,003
1884	314,015	103,312,837
1885	325,916	110,328,375
1886	331,393	113,322,545
1887	339,460	115,783,890
1888	347,134	124,244,911
1889	356,577	132,539,783
1890	363,935	140,277,484
1891	363,922	148,173,487
1892	377,000 (estimated)	155,000,000



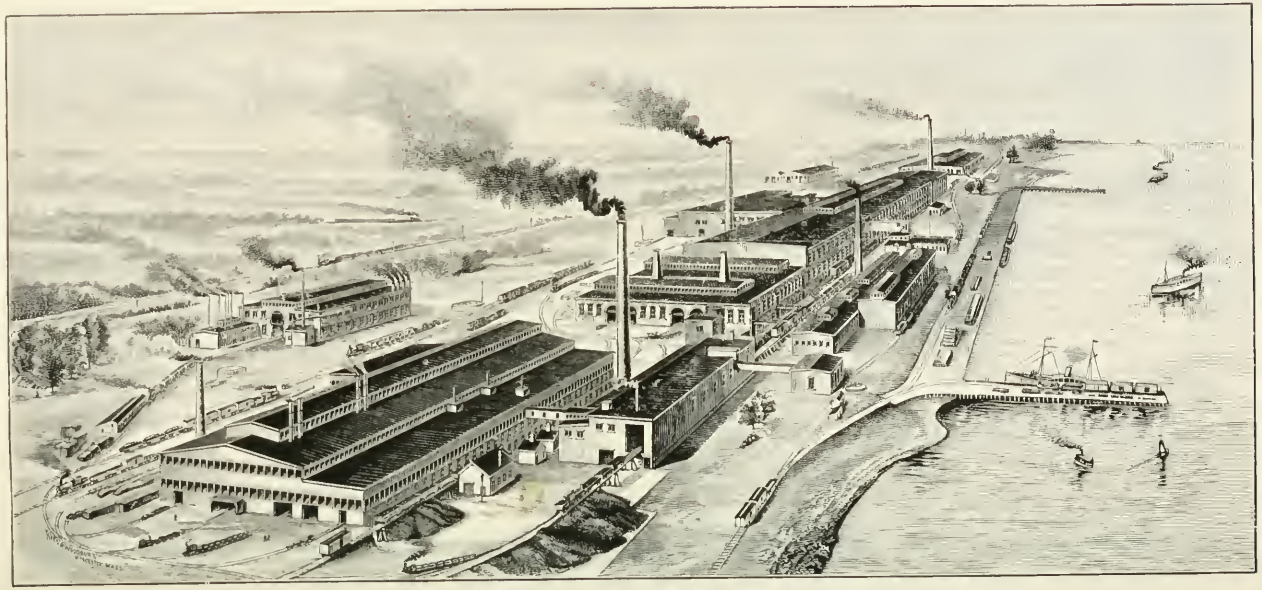
The support of high schools, technical schools, colleges, and universities in 1892 would add more than 23,000 teachers and over $45,000,000 to the expenditure, bringing the whole teaching force to	400,000 in 1892
Expenditure for education in 1892	$200,000,000
Increase in population, 1871 to 1892	$64\frac{64}{100}$ per cent.
Increase in teachers, primary, grammar, and graded	$71\frac{36}{100}$ "
Increase in appropriations, primary, grammar, and graded	$158\frac{33}{100}$ "

Production of Corn, Wheat, Rye, Oats, Barley, and Buckwheat in the United States.



Increase, 1889 to 1892 inclusive as compared to 1865 to 1868 inclusive, 136 per centum.

THE EASTON PUBLIC LIBRARY
NY



Typical American industries.—Washburn & Moen Iron Works, Waukegan, Illinois.

The writer may venture to call attention to the first pamphlet which he ever published, under the title of Cheap Cotton by Free Labor, 1861. In that pamphlet, and in two immediately subsequent magazine articles, he ventured to forecast the development of the cotton-seed-oil industry—the use of the oil and the stearine for food and other purposes; the application of cotton-seed meal and hulls to cattle food if the hulls did not prove to be too valuable for paper stock; the raising of wool on the cotton field in order to double the crop and add the wool clip; also the utilization of the fiber in the stalk and the dyeing and tanning properties in the root not yet accomplished.

If the apparently impossible picking machine should be successfully invented, the fiber of cotton will become the secondary product of the plant. At present, owing to the necessity of picking by hand, the production of cotton gives employment to the largest number of persons engaged in any single product of the field.

	Bales.
1865–'66	2,278,000
1866–'67	2,233,000
1867–'68	2,599,000
1868–'69	2,434,000
1869–'70	3,114,000
1870–'71	4,347,000
1871–'72	2,974,000
1872–'73	3,874,000
1873–'74	4,130,000
1874–'75	3,831,000
1875–'76	4,632,000
1876–'77	4,474,000
1877–'78	4,774,000
1878–'79	5,074,000
1879–'80	5,761,000
1880–'81	6,606,000
1881–'82	5,456,000
1882–'83	6,950,000
1883–'84	5,713,000
1884–'85	5,706,000
1885–'86	6,575,000
1886–'87	6,499,000
1887–'88	7,047,000
1888–'89	6,939,000
1889–'90	7,297,000
1890–'91	8,674,000
1891–'92	9,018,000

Increase in production, 1865 to 1869 inclusive × 1888 to 1892 inclusive, 234 per centum.

The Production of Pig Iron in the United States.

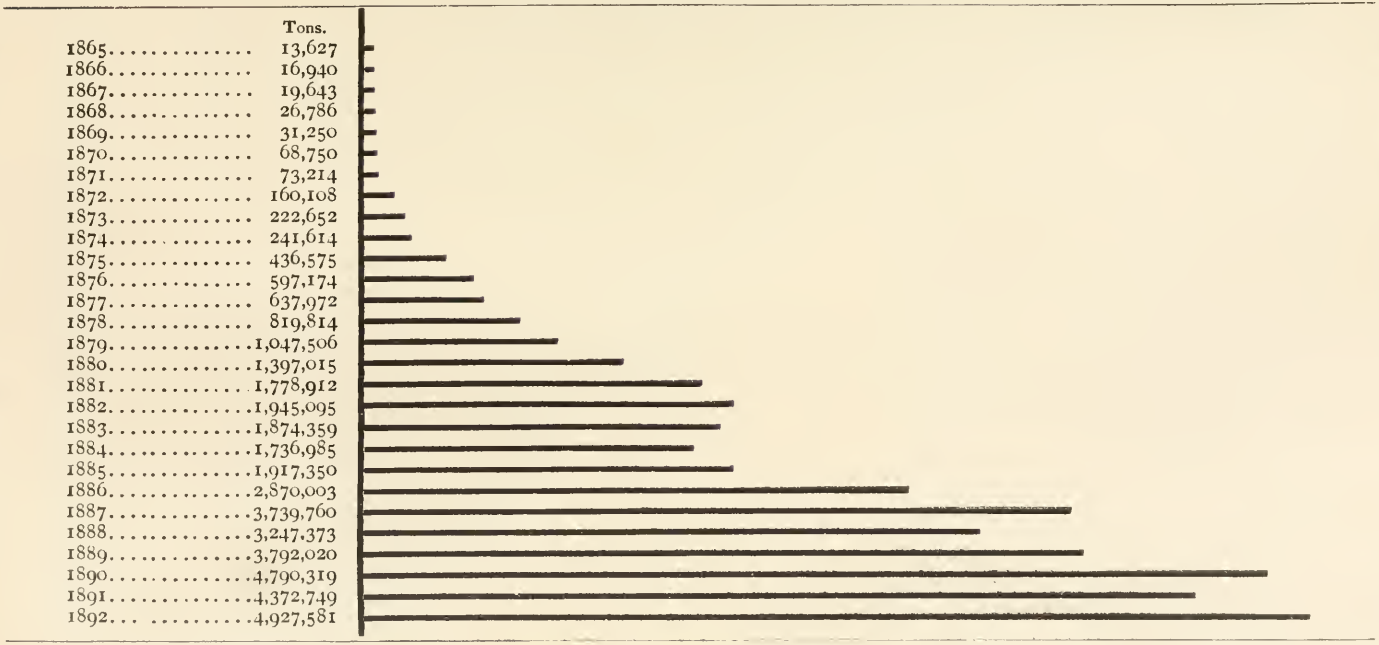
The production of pig iron is in itself a relatively unimportant branch of industry as compared with many others. It is conducted under very arduous conditions of life in the iron and coal mines, coke ovens and iron furnaces alike, at wages which are relatively very low, except as to a small number of men in special departments, as compared with the wages that are earned in all the vast number of arts in which iron and steel are consumed.

The domestic production of iron in this period, to which in some years very large imports have been added, gives an indication of the consumption of iron and steel, than which there is no better standard of material progress. The people of the United States are now relatively and absolutely the largest producers and consumers of iron in the world.

Increase in production, 1865 to 1892, 1,100 per centum.

Production of Steel in the United States.

BESSEMER—OPEN HEARTH AND CRUCIBLE.

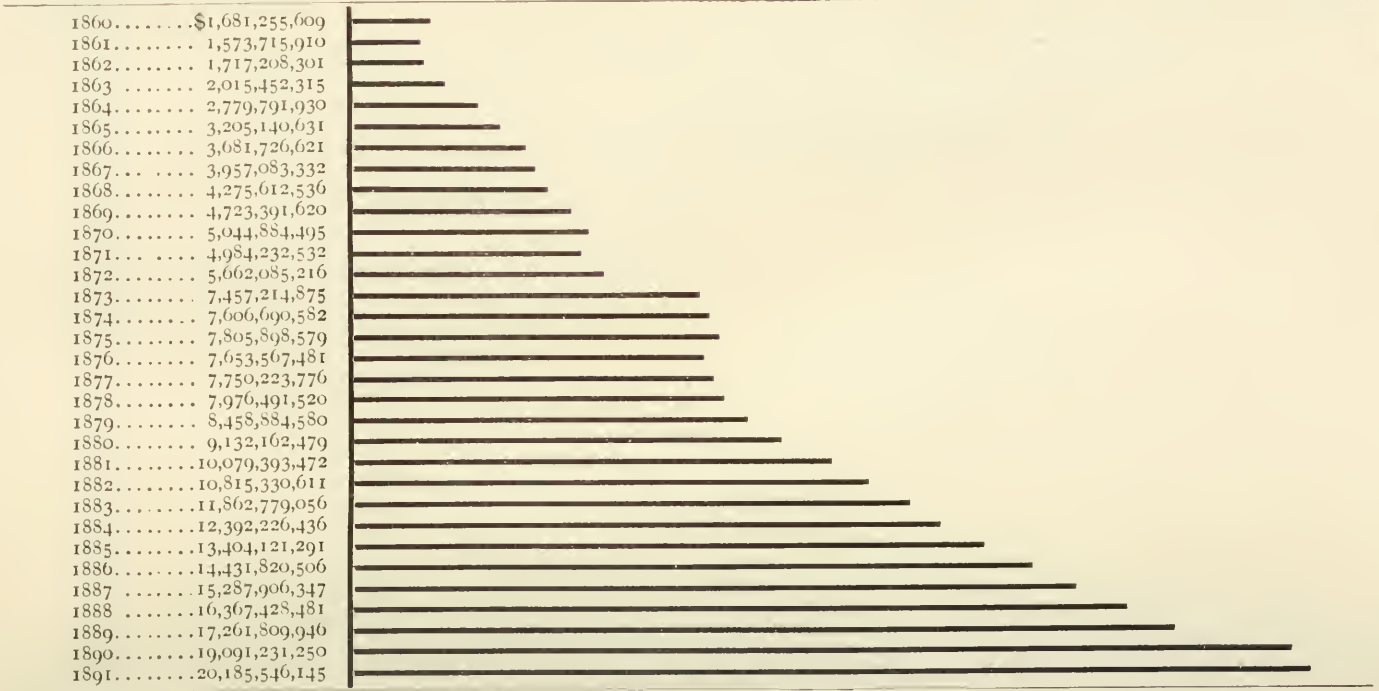


A statement of the increase by percentage would be indefinite. The product of 1892 was 360 times as large as that of 1865, which in percentage would be 3,600.

Insurance against Loss by Fire.

Tables computed by Mr. C. C. Hine, Insurance Monitor, New York.

It is not possible to determine whether property was more fully insured in recent than in former years. According to my own experience, there has been a moderate increase. It is probable that the insurance in 1865 represented one half the destructible value of the property at risk. In 1891 it may have been three fourths.



Upon the hypothesis stated above, the true value of the property insured in 1865 was $3,362,511,218
In 1891..... 26,580,728,193

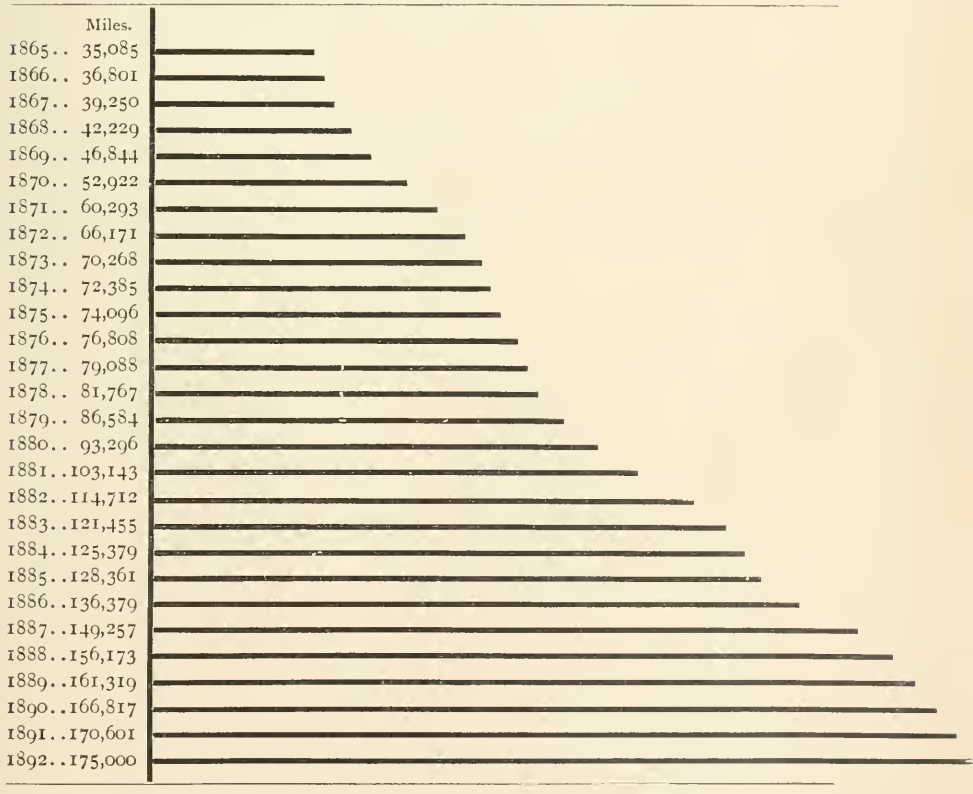
Increase, 1865 to 1891, 690 per centum.

Railway Mileage of the United States.

The extension of the railway service has been accompanied by a very great reduction in the charge for moving merchandise over the various railroads. The data have never been compiled for the whole service from 1865 to 1869 inclusive; therefore any comparison for the last decade as a whole must be made with the traffic of a special line in the former period. For this purpose the New York Central Railroad has been selected—first, because of the miscellaneous quality of its traffic, and, secondly, because of the competition of the Erie Canal.

The average charge per ton per mile on this line, 1865 to 1869 inclusive, was 2¾ cents. In Poor's Railway Manual we now have the data of the freight movement over all the railways, 1883 to 1892 inclusive.

Had the average charge of the New York Central for 1865 to 1869—2¾ cents per ton per mile—been made of the whole railway system in 1883 to 1892 inclusive, the actual charge would have been exceeded in the sum of $11,000,000,000, or in a sum greater than the entire cost of all the railroads in operation December 31, 1892.



Increase in railway mileage, 1865 to 1892, 400 per centum.

Freight Service of all the Railways of the United States.

	Tons moved.
1882	360,490,375
1883	400,453,439
1884	399,074,749
1885	437,040,099
1886	482,245,254
1887	552,074,752
1888	590,857,353
1889	619,165,630
1890	701,344,437
1891	704,398,609

	Revenue from freight.
1882	$485,778,341
1883	539,509,831
1884	502,869,910
1885	509,690,992
1886	550,359,054
1887	636,666,223
1888	639,200,723
1889	665,962,331
1890	740,374,844
1891	754,185,910

	Each ton hauled, miles.	Tons per head.	Charge per head of population.
1882	109.09	6.87	$9.25
1883	110.04	7.45	10.05
1884	112.07	7.09	9.16
1885	112.46	7.77	9.07
1886	109.49	8.40	9.59
1887	111.51	9.40	10.85
1888	110.72	9.84	10.65
1889	110.90	10.10	10.70
1890	114.55	11.20	10.83
1891	115.29	11.00	11.80

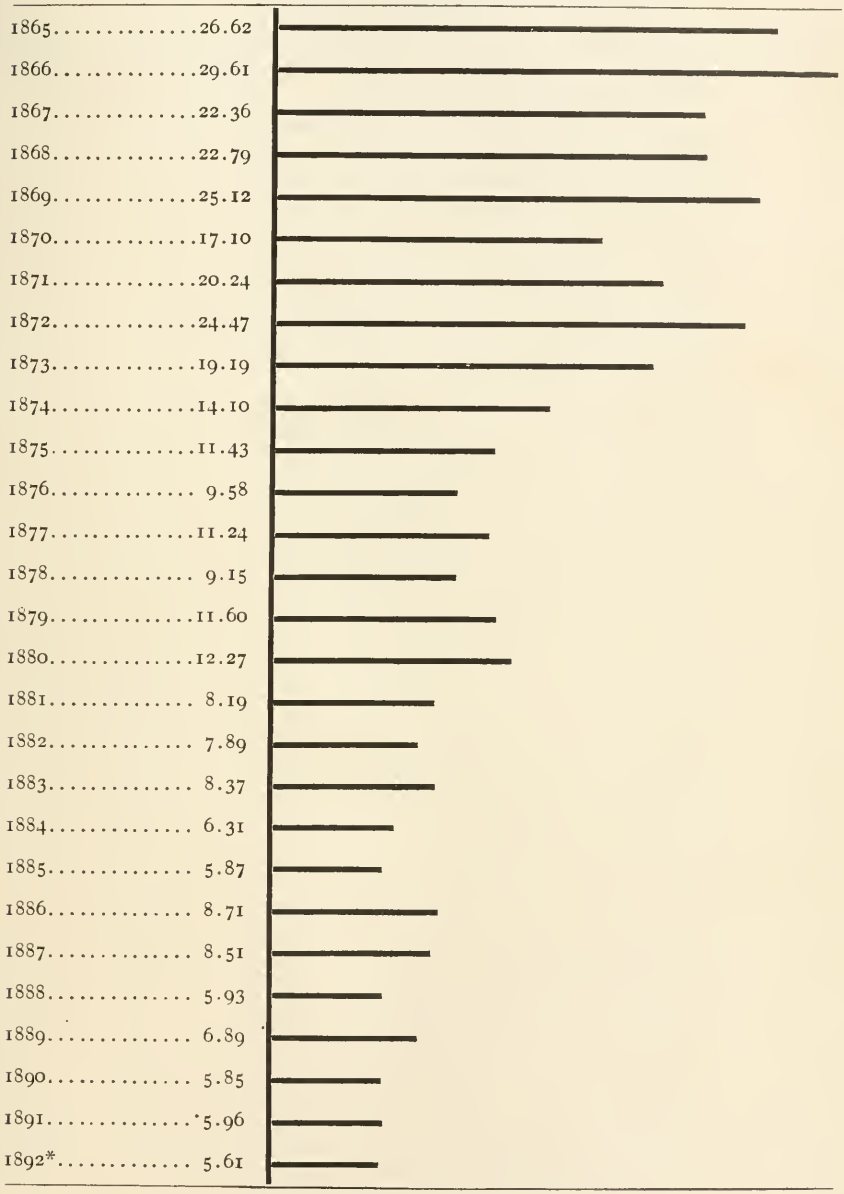
Had the charge per ton per mile in 1891 been at the average rate on the New York Central Railroad from 1865 to 1869, the cost of railway service to each person would have been..... $34.87

The actual cost was..... $11.80

Reduction in general charge for railway service in 1891 as compared with New York Central Railroad in 1865 to 1869, $23.07 per head of population.

Excess of charge in 1865 to 1869, 200 per cent on each ton moved.

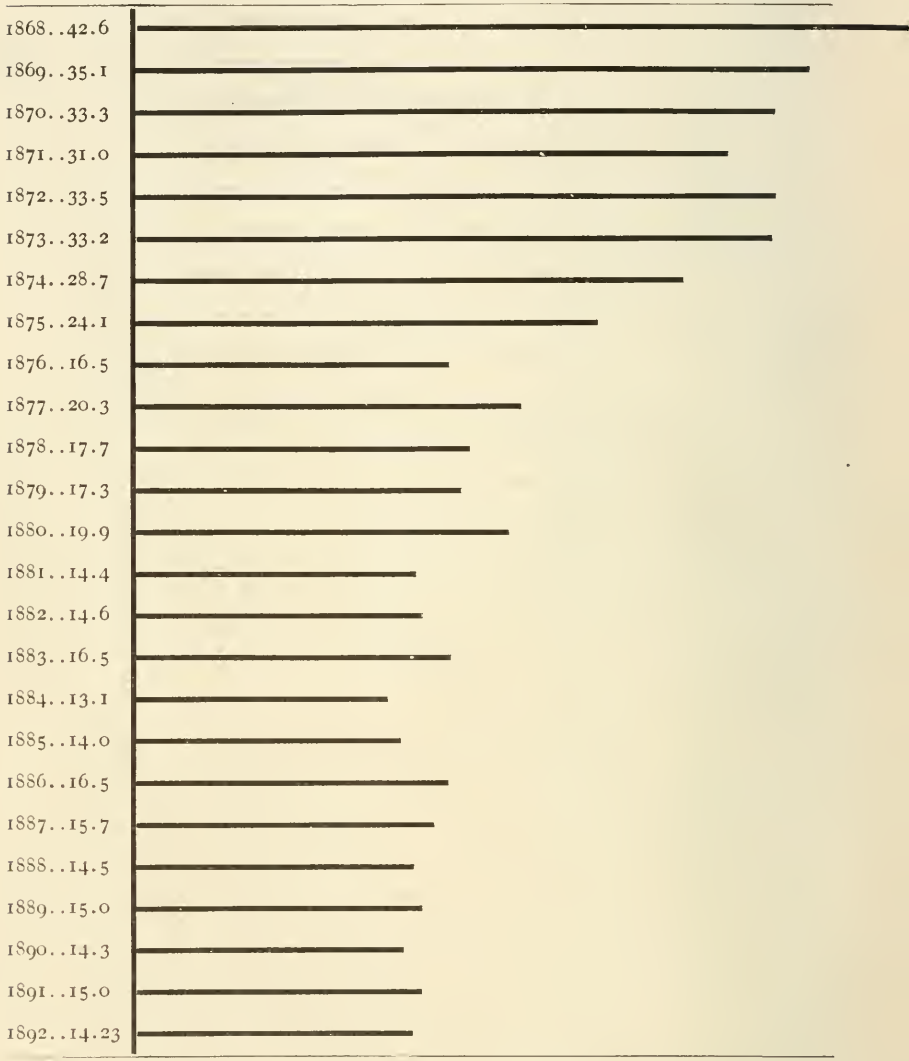
Average Freight Charge on a Bushel of Wheat from Chicago to New York, by Lake and Canal.



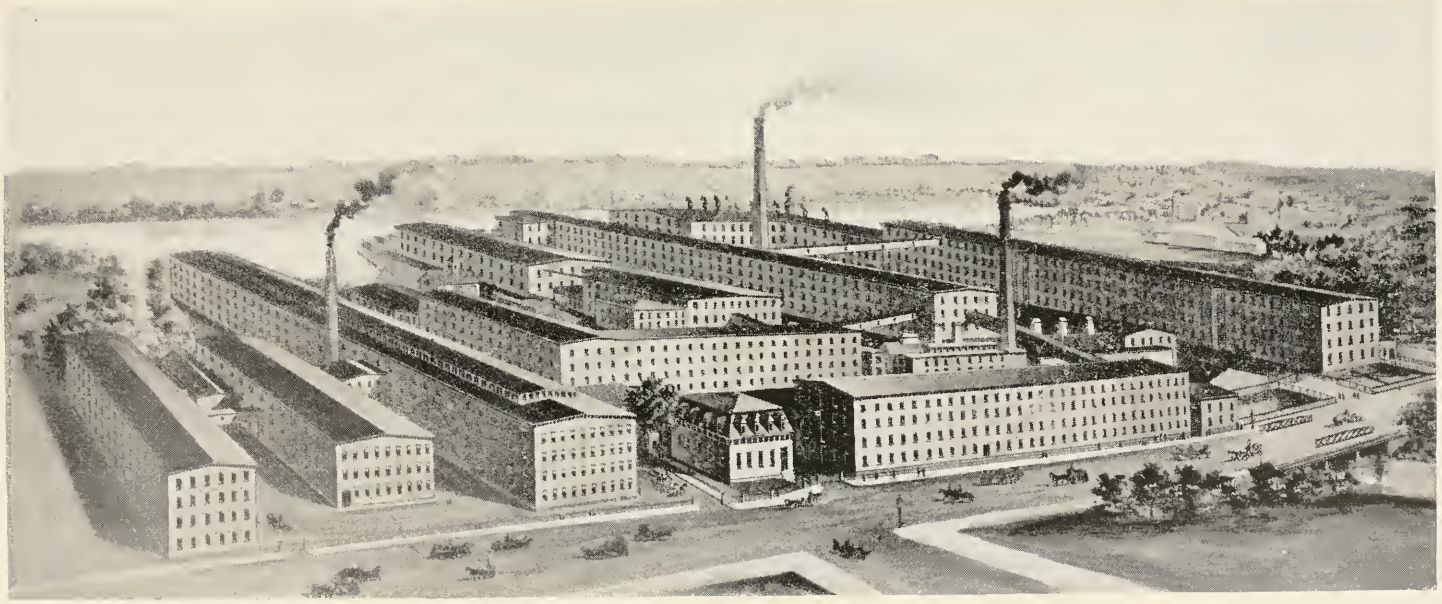
* Exclusive of transfer charges at Buffalo.

The effect of the competition of the railway with railway, and of the rail and canal routes, upon the price of food, is witnessed in the above table. Nearly half the service of the railways consists in moving food material.

Average Freight Charge on a Bushel of Wheat from Chicago to New York, all Rail.



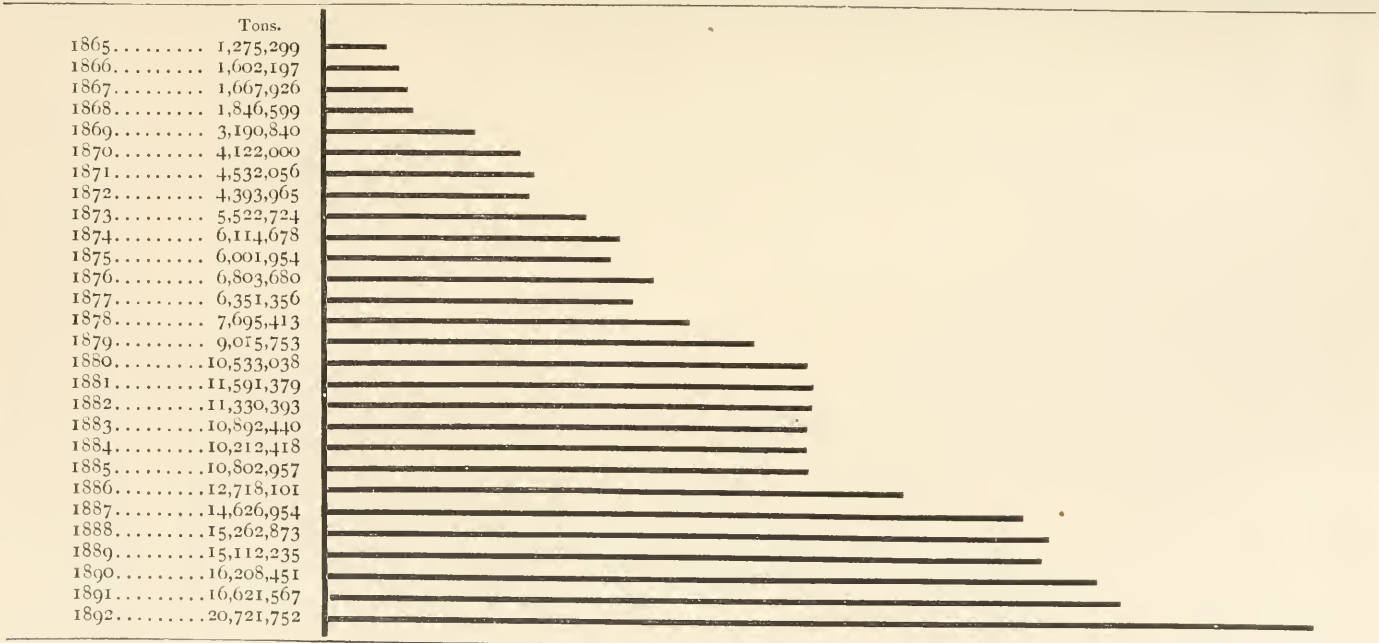
The average freight charge per ton per mile on all the railways which converge at Chicago from East and West, from 1865 to 1869 inclusive, was 2.8153 cents per ton per mile. Had that rate been charged upon the actual traffic of all the railways of the United States for ten years, 1883 to 1892 inclusive, the excess above the actual charge would have been over $11,000,000,000; which is more than the cost of all the railways in the United States, December 31, 1892, represented by their stocks and bonds. The amount saved in ten years to the people as compared to the former charge comes to more than the cost of all the railways.



Typical American industries.—National and Providence Worsted Mills, Providence, Rhode Island.

THE ASTOR LIBRARY NY

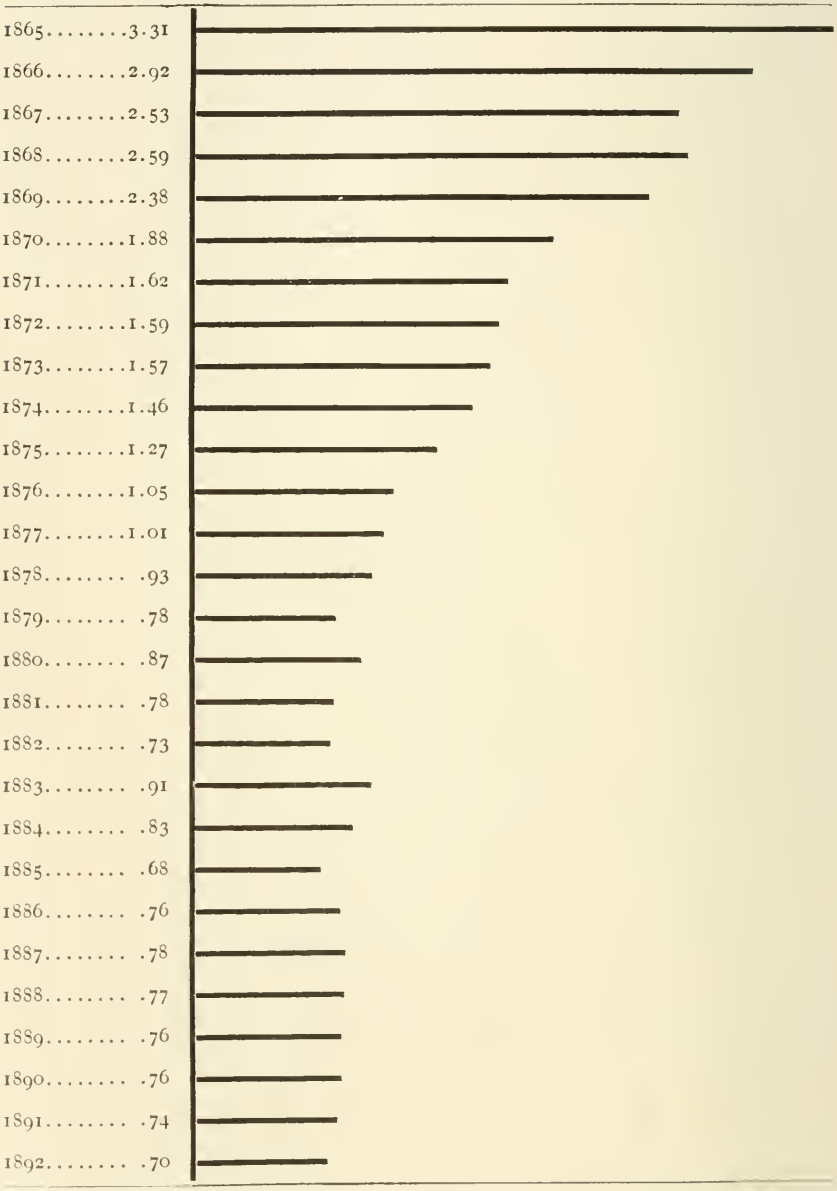
Increase in the Tons of Merchandise moved by the New York Central R. R. and by the New York Central and Hudson River R. R.



Increase of traffic, 1865 to 1892, 1,525 per centum.

Had the freight charge in 1890, 1891, and 1892 been at the rate of 1865 to 1869 inclusive, 2¾ cents a ton a mile, the amount of such charge would have been	$261,132,280
The actual charge amounted to	70,822,645
Difference on the traffic of three years	$190,309,635
The total cost of the New York Central and Hudson River Railroad and its equipment up to December 31, 1892, had been	$153,585,294

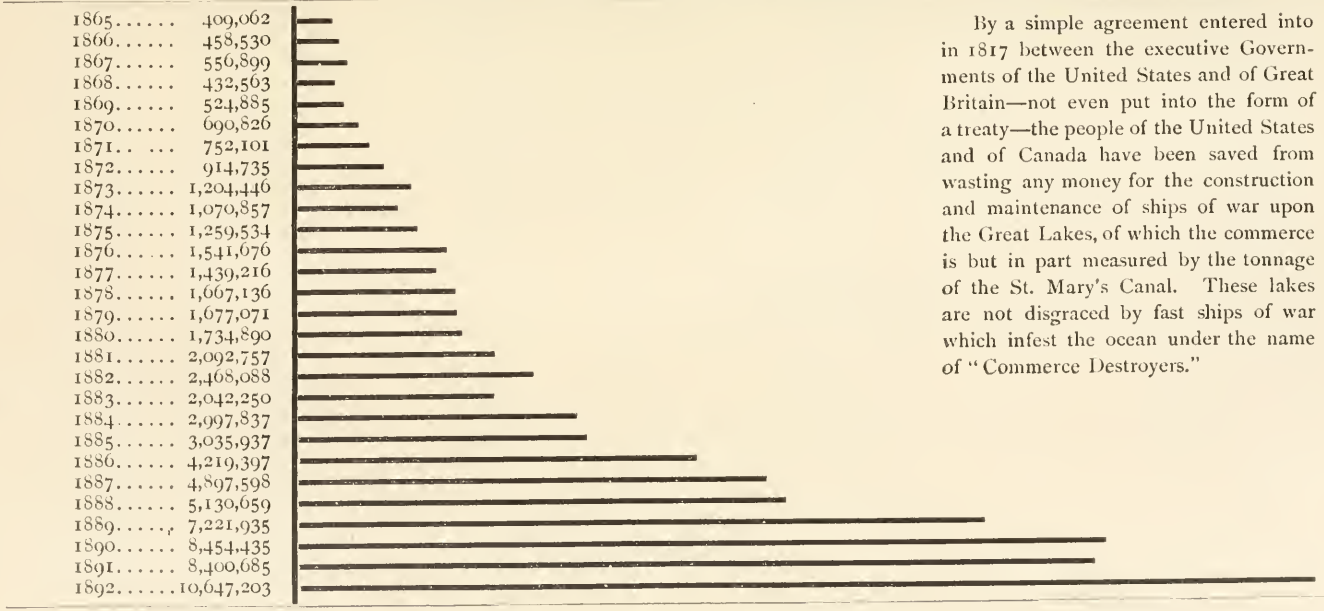
Reduction in the Freight Charge per Ton per Mile, New York Central and New York Central and Hudson River Railroad, in Cents per Ton per Mile.



The average charge from 1865 to 1869 inclusive was 2¾ cents; from 1888 to 1892 inclusive, ¾ of a cent.

Excess of charge, 1865 over 1869, 266 per cent.

Net registered Tonnage passing through the St. Mary's Falls Canal, Michigan, Year by Year, while the Navigation is free from Ice—about Seven Months.



By a simple agreement entered into in 1817 between the executive Governments of the United States and of Great Britain—not even put into the form of a treaty—the people of the United States and of Canada have been saved from wasting any money for the construction and maintenance of ships of war upon the Great Lakes, of which the commerce is but in part measured by the tonnage of the St. Mary's Canal. These lakes are not disgraced by fast ships of war which infest the ocean under the name of "Commerce Destroyers."

Net Tonnage passing through the Suez Canal in Twelve Months, Year by Year, for Five Years.

The Multiple Standard.

A large food ration for one adult for one year, 35 extra, 400 rations in all:

200 pounds corned beef,
100 " salt pork,
100 " smoked ham,
} or their equivalents in fresh meat or fish; these are selected on account of uniformity of price at any given date.

100 quarts milk.
30 pounds butter.
20 " cheese.
17 dozen eggs.
1 barrel flour.
½ " corn meal.
20 bushels potatoes.
80 pounds sugar.
4 " tea.
8 " coffee.
$6 worth of salt, spice, ice, and sundries.

In 1880, 1881, and 1882 the above could be purchased at an average cost of $100, making 400 rations at 25 cents each per day.

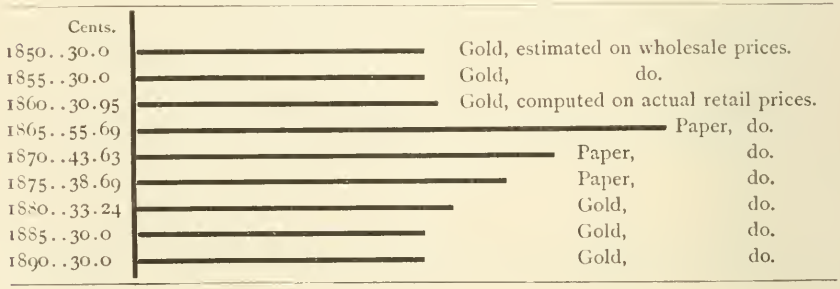
Fuel per person per year, 1½ ton anthracite coal, or its equivalent.

Materials for clothing for one year:

10 yards medium brown cotton.
10 " standard gingham.
10 " 36-in. bleached shirting.
20 " printed calico.
10 " 4-oz. flannel or worsted dress goods.
5 " 16-oz. cassimere.
10 " jeans or light cassimere.
2 pairs men's heavy boots, or their equivalent.

The purchasing power of a dollar in gold and in paper at various periods has been computed by the variations in the cost of the foregoing articles, divided by 400, so as to give the average per day, which, being divided into wages per day, gives the varying purchasing power of a day's wages.

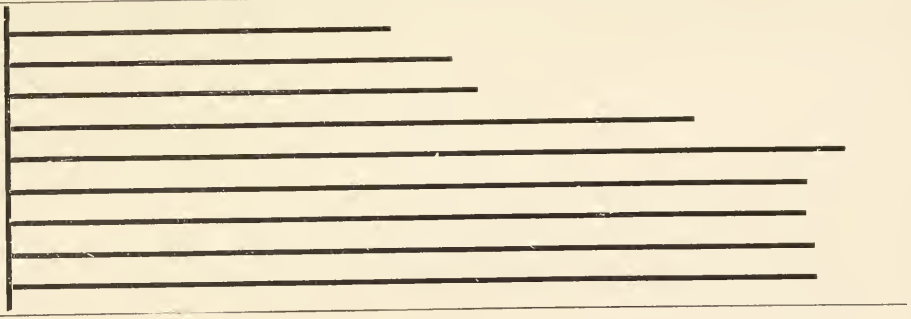
VARIATIONS IN COST PER PORTION.



Progress in Money Wages or Earnings.

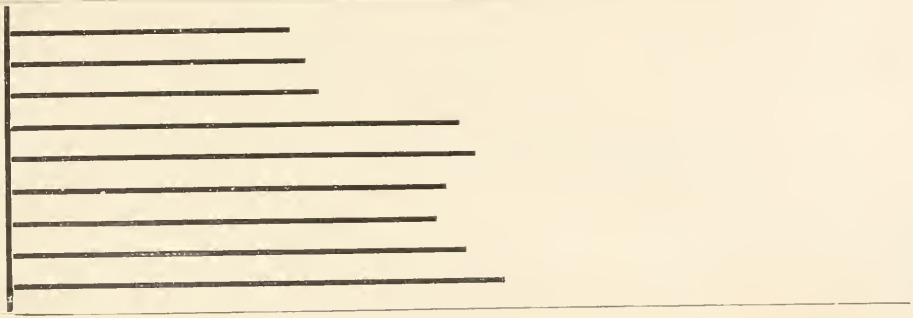
CLASS I.—Men of special skill—foremen, overseers, master mechanics, head carpenters, boss machinists, etc.

1850	$2.00	in gold.
1855	2.30	do.
1860	2.45	do.
1865	3.57	in paper.
1870	4.34	do.
1875	4.14	do.
1880	4.14	in gold.
1885	4 20	do.
1891	4.25	do.



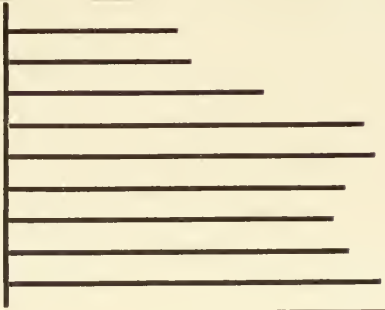
CLASS II.—Average mechanics in continuous occupations—carpenters, masons, machinists, painters, etc. (males).

1850	$1.47	in gold.
1855	1.54	do.
1860	1.60	do.
1865	2.34	in paper.
1870	2.43	do.
1875	2.29	do.
1880	2.26	in gold.
1885	2.40	do.
1891	2.60	do.



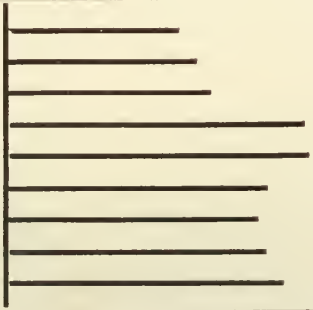
CLASS III.—Operatives in factories and workshops of many kinds—textile, wood, metal, pottery, etc. (male and female).

1850	$0.90	in gold.
1855	0.95	do.
1860	1.33	do.
1865	1.88	in paper.
1870	1.94	do.
1875	1.77	do.
1880	1.71	in gold.
1885	1.80	do.
1891	1.96	do.



CLASS IV.—Laborers in factories, workshops, gas-works, brickyards, and other occupations in continuous employment (males).

1850	$0.90	in gold.
1855	1.00	do.
1860	1.05	do.
1865	1.56	in paper.
1870	1.58	do.
1875	1.38	do.
1880	1.34	in gold.
1885	1.40	do.
1891	1.46	do.

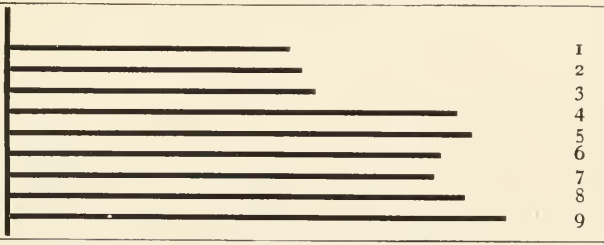


Purchasing Power of the Daily Earnings of Average Mechanics listed in Class II.

The standard by which this is measured is the retail cost of equal quantities of the same kinds of food, fuel, and materials for clothing which correspond to the average daily consumption of artisans and mechanics in New England.

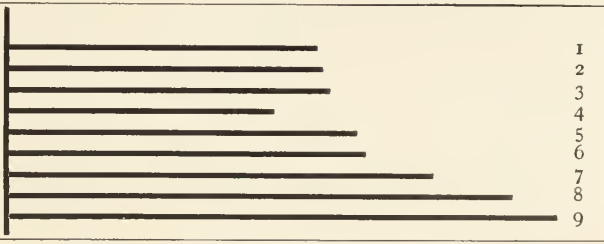
These quantities could be purchased from 1885 to 1890 at an average of thirty cents a day, subject to slight fluctuations year by year, but to no substantial variation. It is an ascertained fact, from a comparison of wholesale prices, that the same quantities of the necessaries of life could be bought in 1850 to 1855 at substantially the same cost, food being then somewhat cheaper and the materials of clothing considerably dearer.

	Price of one portion.		Daily wages.	
1850	30	cents estimated	$1.47,	gold.
1855	30	" "	1.54	"
1860	30.95	" computed	1.60	"
1865	55.69	" "	2.34,	paper.
1870	43.63	" "	2.43	"
1875	38.69	" "	2.29	"
1880	33.24	" "	2.26,	gold.
1885	30	" "	2.40	"
1890	30	" "	2.60	"



Number of Portions which could be bought for Each Day's Wages.

			Portions.	
1850	$1.47 at 30	cents, gold	4.90	
1855	1.54 " 30	" "	5.01	
1860	1.60 " 30.95	" "	5.10	
1865	2.34 " 55.69	" paper	4.20	
1870	2.43 " 43.53	" "	5.58	
1875	2.29 " 38.69	" "	5.66	
1880	2.26 " 33.24	" gold	6.79	
1885	2.40 " 30	" "	8	
1890	2.60 " 30	" "	8.66	



The data of this table from 1860 to 1865 inclusive were compiled from the specific returns in more than one hundred establishments in the East and West, in which the occupation has been continuous. The data of 1850, 1855, and 1890 are compiled from a sufficient number of examples reported in the Finance Committee report to establish a rule.

Woolen Weaving in Rhode Island.

PROGRESS IN EARNINGS AND REDUCTION IN HOURS OF LABOR.

	Hours per d.	Earnings per day.
1850	14	60¼
1851	14	62¾
1852	14	68¾
1853	14	70
1854	14	66½
1855	14	67
1856	14	71¼
1857	14	73¼
1858	14	76¼
1859	14	78
1860	13	82
1861	13	84¾
1862	13	89
1863	13	92¾
1864	13	99¼
1865	13	104¾
1866	13	110½
1867	13	114¼
1868	12	114¼
1869	12	115¼
1870	12	124
1871	12	125¾
1872	12	127¾
1873	12	126½
1874	12	128½
1875	12	128½
1876	12	129¾
1877	12	130½
1878	12	132
1879	12	130
1880	12	128½
1881	12	129¼
1882	12	128
1883	12	127¾
1884	12	130
1885	12	130½
1886	10	130½
1887	10	131
1888	10	130½
1889	10	132½
1890	10	131¾
1891	10	134½

Earnings in cents per hour.

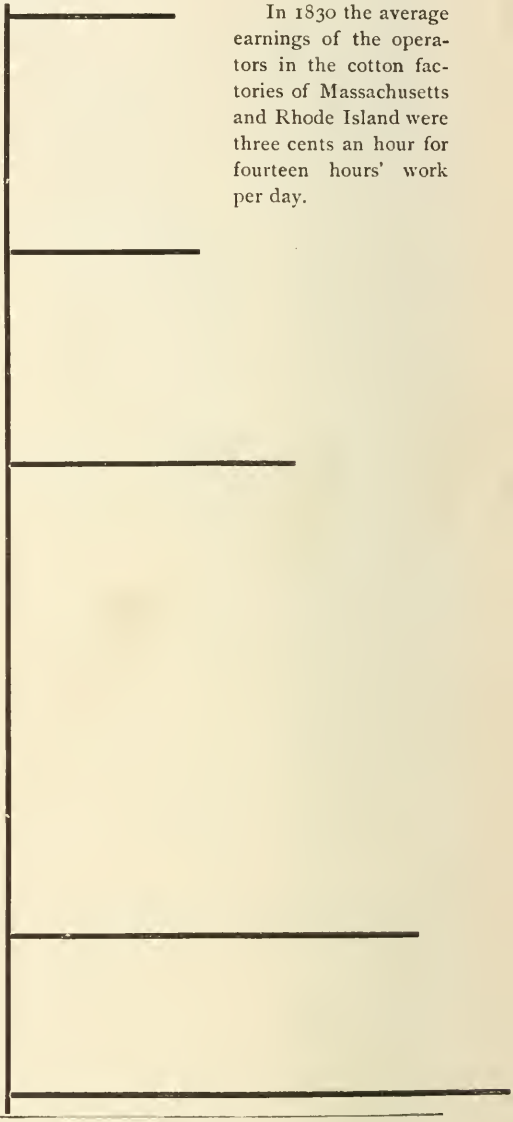
1850 to 1859, Cents per hour, $4\frac{3}{10}$

1860 to 1867, Cents per hour, 5

1868 to 1885, Cents per hour, $7\frac{1}{2}$

1886 to 1891, Cents per hour, $10\frac{6}{10}$

$13\frac{16}{100}$



In 1830 the average earnings of the operators in the cotton factories of Massachusetts and Rhode Island were three cents an hour for fourteen hours' work per day.

Earnings, 1850: 14 hours' work in cents per hour..... 4.30 cents
" 1892: 10 " " " ..... 13.45 "
Difference ..... 9.15 "

Gain in earnings per hour, 212 per centum.

Typical American industries.—Baldwin Locomotive Works, Philadelphia.

Progress in Money Wages or Earnings.

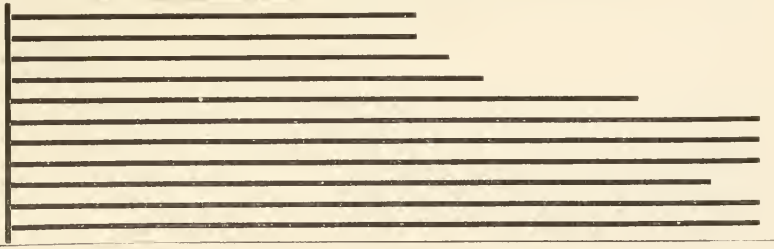
Two examples selected from among many of like kind, all of which are governed by the same rule which establishes the rate of wages:

No. 1, passenger-car conductors, whose earnings closely correspond to those of overseers in factories, foremen, and master mechanics.

No. 2, firemen in gas works, whose work is laborious, but who must possess an aptitude corresponding to that of a good mechanic at corresponding wages.

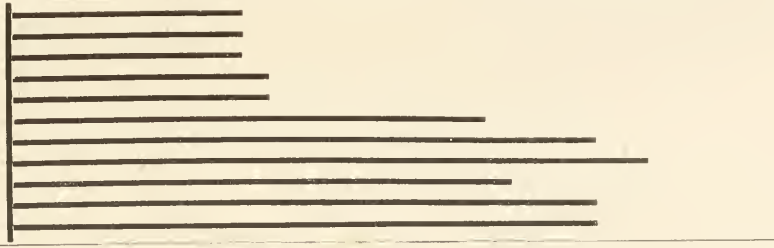
No. 1.—Passenger-car Conductors on an Extensive Line of Railway.

1840	$2.11	in gold.
1845	2.11	do.
1850	2.30	do.
1855	2.49	do.
1860	3.19	do.
1865	3.83	in paper.
1870	3.83	do.
1875	3.83	do.
1880	3.65	in gold.
1885	3.83	do.
1890	3.84	do.



No. 2.—Firemen in an Extensive Gas Works.

1840	$1.20	in gold.
1845	1.20	do.
1850	1.20	do.
1855	1.34	do.
1860	1.34	do.
1865	2.50	in paper.
1870	3.00	do.
1875	3.25	do.
1880	2.63	in gold.
1885	3.00	do.
1890	3.00	do.

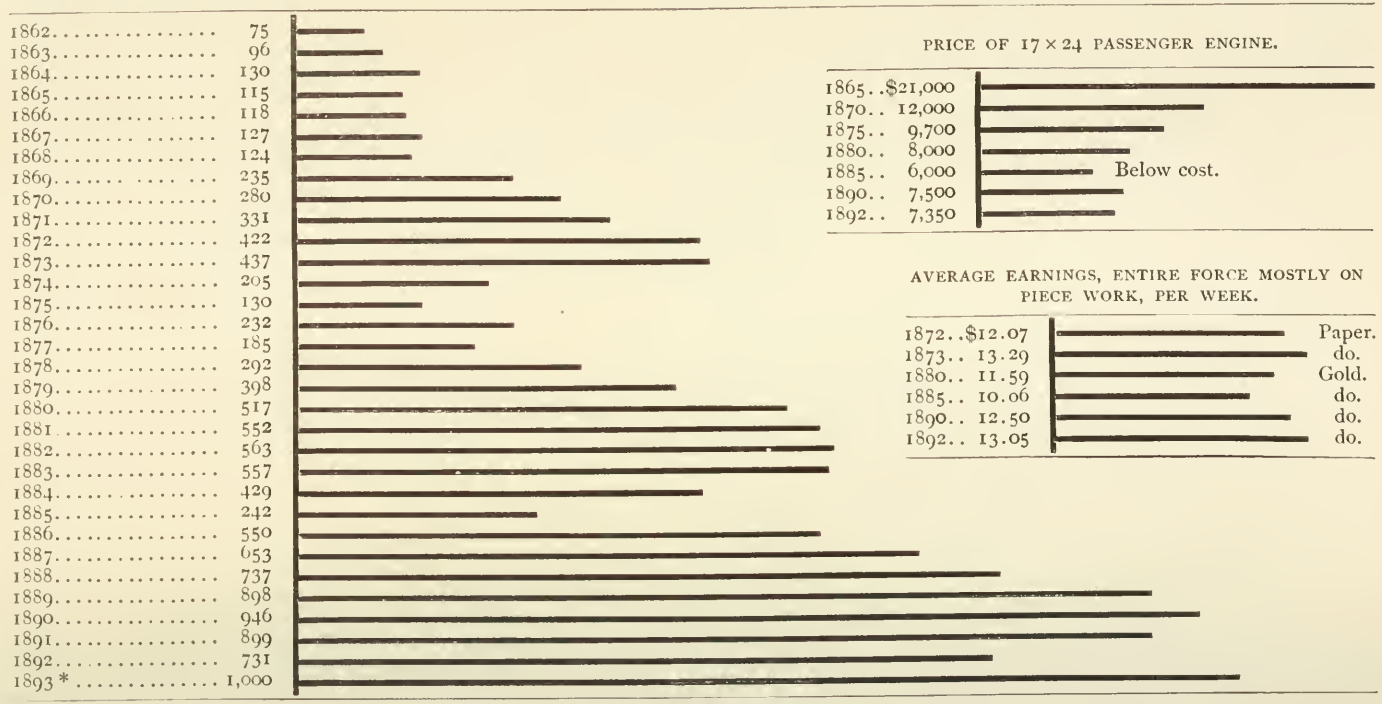


The same rule holds in every branch of industry, subject to occasional variations due to special causes. The evidence is, however, conclusive, that while all rates of wages have nearly or quite doubled in the last fifty years the hours of labor have been much reduced, yet the purchasing power of each dollar is now substantially the same as it was in 1850. The advance in wages has been in proportion to the relative skill required. The skilled laborers have gained the most, the common laborers the least.

Baldwin Locomotive Works. Burnham, Parry, Williams and Company, Philadelphia, Pa.

The development of the locomotive engine is one of the best standards by which to measure material progress. The figures upon this sheet have been furnished by an establishment whose engines are made both for domestic use and for export.

It will be observed that while the price of the standard 17 × 24 passenger locomotive has diminished, its power has been increased by 50 per cent.



PRICE OF 17 × 24 PASSENGER ENGINE.

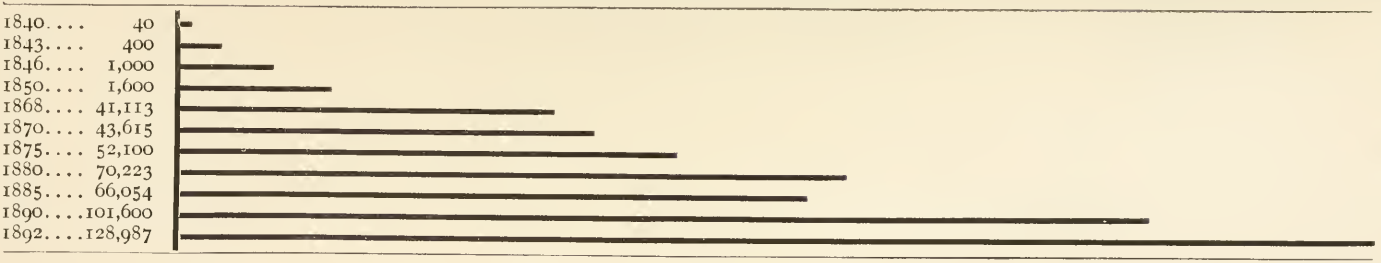
AVERAGE EARNINGS, ENTIRE FORCE MOSTLY ON PIECE WORK, PER WEEK.

* Capacity of the establishment.

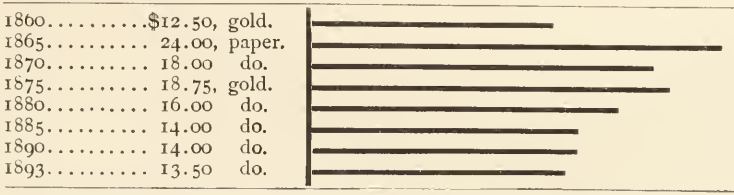
It will be remarked that while the general average of all employees in 1890 to 1892 was as high in *gold* as the earnings were in 1872 and 1873 in depreciated paper, the fall in the prices of the necessaries of life between these two periods had been such as to increase the purchasing power of each dollar in 1890 to 1892 from 35 to 45 per cent.

Deere and Company, Moline Plow Works, Moline, Illinois.

AGRICULTURAL IMPLEMENTS MADE.



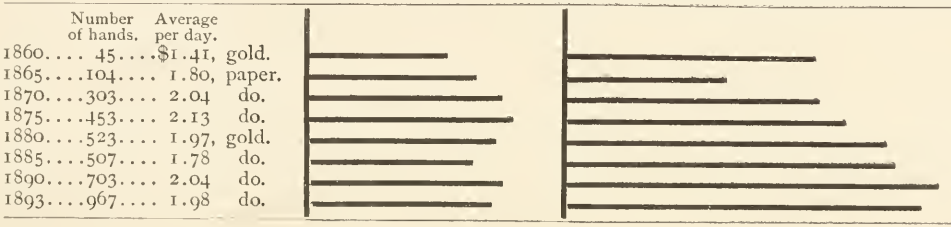
PRICE OF A 14-INCH STUBBLE PLOW.



The plow of 1860 was made of steel of a low grade. The plow of 1890–'93 is made of hardened steel of the highest grade, and is 25 per cent more effective than the plow of 1860.

AVERAGE EARNINGS OF ALL HANDS EMPLOYED.

COMPUTED PURCHASING POWER IN FOOD, FUEL, AND CLOTHING, ON THE MULTIPLE STANDARD.



In 1860 skilled mechanics of the highest type were required in almost all branches of the work. In 1890 to 1893, through the introduction of machinery and the division of labor, ordinary laborers of reasonable intelligence can be qualified in a short time to do the greater part of the work.

Our National Domain.

GRAPHICAL PRESENTATION OF THE COMPARATIVE AREAS OF THE STATES AND TERRITORIES OF THE UNITED STATES AND THE COUNTRIES OF EUROPE, OMITTING RUSSIA AND ALASKA.

	Name.	*Sq. miles.*
1.	Texas	262,290
2.	Austrian Empire	240,942
3.	German Empire	211,149
4.	France	204,177
5.	Spain	197,767
6.	Sweden	170,973
7.	California	155,980
8.	Dakota	147,700
9.	Montana	145,310
10.	Norway	123,205
11.	New Mexico	122,460
12.	Great Britain & Ireland	120,832
13.	Italy	114,410
14.	Arizona	112,920
15.	Nevada	109,740
16.	Colorado	103,645
17.	Wyoming	97,575
18.	Oregon	94,560
19.	Idaho	84,290
20.	Utah	82,190
21.	Kansas	81,700
22.	Minnesota	79,205
23.	Nebraska	76,185
24.	Indian Territory	69,830
25.	Missouri	68,735
26.	Washington	66,880
27.	Turkey in Europe	63,850
28.	Georgia	58,980
29.	England and Wales	58,186
30.	Michigan	57,430
31.	Illinois	56,000
32.	Iowa	55,475
33.	Wisconsin	54,450
34.	Florida	54,250
35.	Arkansas	53,945
36.	Alabama	51,540
37.	North Carolina	48,580
38.	Roumania	48,307
39.	New York	47,620
40.	Mississippi	46,340
41.	Louisiana	45,420
42.	Pennsylvania	44,985
43.	Tennessee	41,750
44.	Ohio	40,760
45.	Virginia	40,125
46.	Kentucky	40,000
47.	Portugal	36,028
48.	Indiana	35,910
49.	Ireland	32,531
50.	South Carolina	30,170
51.	Maine	29,875
52.	Scotland	29,820
53.	Greece	25,014
54.	West Virginia	24,645
55.	Bulgaria	24,369
56.	Bosnia & Herzegovina	23,570
57.	Servia	18,800
58.	Switzerland	15,892
59.	Denmark	14,124
60.	Eastern Roumelia	13,500
61.	Netherlands	12,648
62.	Belgium	11,373
63.	Maryland	9,860
64.	Vermont	9,135
65.	New Hampshire	9,005
66.	Massachusetts	8,040
67.	New Jersey	7,455
68.	Connecticut	4,845
69.	Montenegro	3,550
70.	Delaware	1,960
71.	Rhode Island	1,085
72.	Andorra	175
73.	District of Columbia	60
74.	Monaco	6

Relative Progress in Population and in the Principal Elements of Wealth and Welfare compared at Various Periods.

1.	Gain in population—1865, 34,748,000; 1892, 65,520,000	88½ per cent.
2.	National expenditures per capita—1879 to 1882, average $5.18; 1889 to 1892, $5.03. Excess in first period	3 "
3.	National taxation per capita—1865, $15.73; 1892, $5.43. Excess in 1865	190 "
4.	National debt per capita—1865, $76.98; 1892, $12.85. Excess in 1865	500 "
5.	The combined imports and exports of the United States were in 1865 $404,744,883; in 1892, $1,857,680,610. Increase	361 "
6.	The cost of moving a bushel of wheat from Chicago to New York by lake and rail from 1865 to 1868 was $26\frac{6}{10}$ cents; in 1892, $5\frac{61}{100}$ cents. Excess in first period	352 "
7.	The charge for moving merchandise over the New York Central Railroad in 1865 averaged 3.31 cents per ton per mile; in 1892, average .70 cent per ton. Excess in 1865	370 "
8.	The postal receipts of the United States—In 1865, $14,556,159; in 1892, $70,930,475. Increase	387 "
9.	Appropriations for common schools—In 1865, $60,107,612; in 1892, $155,000,000. Increase	158 "
10.	Production of grain, corn, wheat, rye, oats, barley, and buckwheat—In 1865 to 1868 inclusive, an average of 1,312,761,319 bushels; in 1889 to 1892 an average of 3,109,115,463 bushels. Increase	136 "
11.	Production of cotton—The crops of 1865 to 1869 averaged 2,386,000 bales; in 1888 to 1892 averaged 7,982,000 bales. Increase	234 "
12.	Production of pig iron—1865, 931,582 tons; 1892, 10,255,840 tons. Increase	1,100 "
13.	Production of steel—1865, 13,627 tons; 1892, 4,927,581 tons. Increase	3,606 "
14.	Property insured against loss by fire—Assuming that in 1865 the insurance covered only one half the value of the insured property, and in 1892 three quarters, the insurance contracts indicate a value in 1865, $3,362,511,218; in 1892, $26,580,728,193. Increase	690 "
15.	Railway mileage—1865, miles in operation, 35,085; 1892, miles in operation, 175,000. Increase	400 "
16.	New York Central Railroad—1865, tons freight, 1,275,299; 1892, tons freight, 20,721,752. Increase	1,525 "
17.	St. Mary's Ship Canal—1865 to 1868, average tonnage passing, 464,263; 1889 to 1892, average tonnage passing, 8,681,064. Increase	1,770 "
18.	Purchasing power of a dollar; equal quantities of the same kinds of food, fuel, and materials for clothing—In 1865, one dollar in paper would buy 1.80 portions; in 1892, one dollar in gold would buy 3.33 portions. Increase	85 "
19.	Workmen in a New York gas works—Firemen's wages, 1845 to 1850 inclusive, were $1.20 per day; 1885 to 1890, $3.00. Increase	150 "
20.	Weavers in a woolen mill—Adult men and women worked in a Rhode Island woolen mill 14 hours a day at $4\frac{3}{10}$ cents an hour, earning 60¼ cents a day. In 1892 weavers worked in the same	

mill 10 hours a day at $13\frac{16}{100}$ cents per hour, earning $\$1.34\frac{1}{2}$ cents per day.		
Increase per hour	212	per cent.
Increase per day	123	"
21. Mechanics' earnings—The average earnings of a large number of carpenters, machinists, painters, and other mechanics in establishments of continuous occupations were, in paper, in 1865, $2.34; in gold, in 1892, $2.60. The earnings of 1865 would buy equal quantities of the same kinds of food, fuel, and clothing at $55\frac{69}{100}$ cents per portion in 1892 at 30 cents. Purchasing power in 1865, 4.20 portions; in 1892, 8.66 portions. Increased value of a day's wages	106	"
22. Standard freight locomotive—1865, price in paper, $21,000; 1892, price in gold, $7,350. The engine of 1892, 50 per cent more effective. Excess of price in 1865	186	"
23. Steel stubble plows—The price of a low-grade steel plow in 1865 was $24 in paper; a high-grade steel plow in 1893, $13.50. Excess of price in 1865	78	"
The average earnings of all the workmen in the establishments in Illinois were, in paper, in 1865, $1.80; in gold, in 1893, $1.98. The purchasing power of the wages in 1893 in equal quantities of the same kinds of food, fuel, and materials for clothing, increased	111	"

Compiled and computed from various authorities, April, 1893.

Farm Mortgages.

Through the courtesy of the Superintendent of the Census and of Mr. George K. Holmes, special agent in charge, I am enabled to give partial data in regard to farm mortgages which may excite some surprise. The data given in the subsequent table correspond to statements furnished me by the department, subject to slight correction in the future. The data of other Western States, such as Ohio, Illinois, Michigan, Nebraska, Kansas, and Missouri, have been printed and circulated, but not compiled and tabulated together. The conclusions are the same. The proportion of farms free of mortgage is greater among the older Western States, such as Illinois, Ohio, and Michigan, than in the newer States of the Mississippi Valley, such as Kansas and Nebraska, but the final conclusions are the same:

1. The proportion of farms hired varies; it is greater in the older States, less in the newer States of the North.

2. The proportion of farms hired in the Southern States is very large; doubtless due to the common system of renting the former plantations to the negroes, who now cultivate either on shares or on a fixed rental.

THE STOR LI NY ARY

Typical American industries.—Deere Plow Works, Moline, Illinois.

The increase in the proportion of rented farms in the grain-growing States calls for explanation. Had it been an indication of the buying up or consolidation of small farms in great areas to be let in parcels by single owners, the tendency might have been a bad one; but it is not. Outside the State of California, where the Mexican grants laid the foundation of great estates, the number of farms is steadily increasing and the average area is diminishing. Even many of the great wheat farms in the far North which had been cultivated by machinery are being cut up.

Selecting the State of Illinois as perhaps the best example of a distinctly prairie and grain-growing State long settled and early divided into farms of moderate size, we find a record (not yet complete) of 251,182 farms; 159,670 worked by the owners, 91,512 occupied by tenants. Disregarding fractions, sixty-three per cent of these farms, whether operated by owners or tenant farmers, are free from the incumbrance of any mortgage of any kind; thirty-seven per cent subject to mortgage in the usual proportion of somewhat less than half the value.

In this State are to be found the largest proportionate number of tenants in any of the grain-growing States. The explanation of this is given by the special expert of the census, whose attention was attracted to it very early in the investigation, and by other most competent observers, notably Mr. S. T. K. Prime, the compiler of one of the most trustworthy crop reports, which brings him into close communication with all the grain-growing States.

The principal reason why farms are passing into the hands of tenants is, that the older farmers have in many cases accumulated sufficient property to enable them to move to the towns. They do this for the purpose of educating their children in high schools, academies, and sometimes in colleges, and also because they find town life more agreeable than the somewhat isolated life of the farm. In many cases the sons choose other occupations and do not go back to the farm. On the other hand, industrious farm laborers who have been in the receipt of high wages prefer in many cases to become farm tenants in the neighborhood where they have worked, rather than to move away to the yet more isolated life of the distant States. In lesser number the tenants upon the farms are the children of the original owners; in greater number they are either those who have been farm laborers, or those who elect to hire a farm in a well-settled community, rather than to buy a farm at a much greater distance from the centers of trade.

Again, especially in Ohio, the older farmers have found that their large farms make too great a demand upon them after their sons have grown into manhood and have gone into other occupations; and if the entire farm is not divided up into several tenancies, a portion of it is placed in the charge of a tenant, while the owner continues to work the other portion himself.

All correspondents concur in the view that farms are not allowed to deteriorate under tenant cultivation. The increase of farm tenancies is a step in the progress of the tenant. This rule, which I believe the true one, may be sustained by one single example. A census has been taken in a single village in Illinois. In a population of one thousand persons there are forty-five retired farmers who live upon the income of their property, of which the rent from their farms constitutes a part. This case is cited as an indication of the general conditions throughout the State.

The final result of the census investigation of farm mortgages, sustained by other competent evidence, is as follows:

With respect to the Western or grain-growing States, the facts are that more than one half the farms are free from the incumbrance of any mortgage whatever. Somewhat less than one half are subject to mortgage, but such mortgages on the 1st of January, 1890, amounted to less than one half the true value of the mortgaged premises. Nearly all the money borrowed on mortgage had been borrowed either for the purchase of the land or for its improvement. The average term of a farm mortgage is less than five years. In other words, the farm lands of the grain-growing Western States, taken as a whole, are subject to a mortgage of less than twenty-five per cent of their true value.

In support of these statements the following tables are submitted. The facts tabulated—affecting six New England States, four of the Southern States, and two of the Western States—will give a general view of the conditions. The facts submitted in regard to the State of Iowa and to the State of Montana will give special information affecting the class of States to which these two belong:

Increasing Product—Higher Wages—Lower Prices.

A few years since the writer compiled a statement of the facts proving that, throughout the period from 1860 to 1886, the rule was fully sustained that by the application of science and invention "in proportion to the increase and effectiveness of capital the quantity of products is increased, the price is reduced, the margin of profits is diminished, and the earnings of labor are augmented."

Farm Mortgages.

SIX NEW ENGLAND STATES, MARYLAND, SOUTH CAROLINA, GEORGIA, TENNESSEE, IOWA, AND MONTANA.

Total number of farms	952,757
Hired (in the South, 266,765 ; in the North, 96,761)	363,526
Owned by occupants	589,231
Free of mortgage	436,563
Subject to mortgage	152,668
Value of farms which are subject to mortgage	$522,190,916
Mortgage upon the same	$193,683,721
Per cent of mortgage to value	$37\frac{09}{100}$

STATE OF IOWA.

Number of farms	205,435
Owned by occupants	144,698
Free of mortgage	67,587
Subject to mortgage	77,111
Hired	60,737
Value of all farms	$857,581,022
Value of mortgaged farms	$305,658,699
Mortgage on the same	$101,745,924
Per cent of mortgage to value of mortgaged farms	$33\frac{29}{100}$
Per cent of mortgage to value of all farms	$11\frac{86}{100}$

STATE OF MONTANA.

Number of farms	6,441
Hired	863
Owned by occupants	5,578
Free of mortgage	4,709
Subject to mortgage	869
Value of mortgaged farms	$4,887,335
Mortgage on the same	$1,548,816
Per cent of mortgage	$31\frac{69}{100}$

In the period named this rule was subjected to a great variation, due to the combined influence of the civil war and depreciated paper money. Since the war ended it again came into force, effecting a greater beneficial change after the resumption of specie payments, January 1, 1879, than before the suspension. The motive by which this beneficial change is accomplished is what may be called the higher law of competition—a law by which all employers are actuated, who produce or deal in the necessaries of life. Under this higher law of competition, the effort of every producer is to make a better quality of goods or wares at a lessening cost; this is accomplished by paying the highest rates of wages which the market price for the goods will permit, to the most skillful workman who makes these goods at the least cost but at these high rates of earnings. Under the influence of this rule there is a constant tendency toward an increasing disparity in the earnings of skilled as compared with unskilled labor. All share in the benefit of lessening prices in a certain measure, but the benefit is not divided in equal proportion. The reasons for these variations are not far to seek.

The factors in productive industry are not only land, labor, and capital—these are the material factors; to these should be added two others: first, time, which each one may share alike so long as each one maintains his personal control over it; and, second, mental capacity, the latter the most important of all, whether exerted in the control and direction either of land, of capital, of machinery, or of the tools of manual trades. Each of the three material factors—land, labor, and capital—will be productive only in proportion to the intelligence by which it is directed.

In order to comprehend this rule, the transactions of the stock market must be set aside. They are apt to be the first that attract attention when people are dealing with disparity in fortunes. These transactions, however, merely affect the distribution of the wealth which has already been accumulated. It matters not that these transactions may be under the malignant influence of an unconvicted felon, or may be conducted by men every dollar of whose wealth may be the token of an equivalent service rendered to society. Whatever may be the speculation in the stock market in the securities which represent the ownership of the stock, yet the railway, the factory, the great commercial enterprises, and the banking institutions must all be conducted under the same rule of service for service, without regard to the character of the men who own or deal in the stocks or bonds.

This rule which governs all commerce, whether among nations or men, is, that in all the exchanges of product for product in which commerce consists, there must be a gain or benefit to both parties—buyer and seller, seller or buyer—else the traffic will not be continuous.

The effect of competition under this imperative rule is that the tendency of profits is constantly to a minimum, the tendency of wages to a maximum, both being limited by the price that the product will bring. There may be temporary fluctuations and variations, such as those which were so manifest in the paper-money era, and such as are now beginning to exert an influence under the threat of the debasement of the unit of value. Yet in any continuous period of fairly stable monetary conditions the working of competition in bringing about lower prices, lessening profits, and higher wages can be traced.

It had been very difficult for any student of social laws to develop this rule on the basis of experience, until the publication of the tenth volume of the census of 1880, compiled by Joseph D. Weeks, was issued. The writer had made some progress in demonstrating it, and had ascertained the facts that had governed several establishments through a long period of years; but in this census volume the data were given for a very much larger number of establishments in all parts of the country from which adequate information could be derived.

Unfortunately, this line of investigation was not continued in the census of 1890, but the Finance Committee of the Senate ordered a more complete statement of the case to be made under Commissioner Carroll D. Wright. His report on wages covers in the most thorough manner a period of fifty years. As yet, the data of prices published affect only the two years 1890 and 1891.

One may deal with these facts by making great averages of various classes of workmen spread over a very large area, but the writer regards this as a very fallacious method. The great benefit to science which has been accomplished by the issue of the census volume of 1880 is that the data are taken from books of typical establishments in which employment has been continuous. In each establishment the employees are classified according to the sex and the department of their work. From each of these typical establishments the general rates of wages in each section may be deduced by analogy, because all wages in a given section are governed by a common rule. The same rule of classification is

followed even more thoroughly in the compilation of Commissioner Wright's report.

The time has not sufficed to make a complete use of this wonderful volume on wages, as it has been issued only within a very short time. It has enabled me to verify the analysis made by myself in 1887 on the data of the wages of 1860 to 1885 inclusive. It has also enabled me to bring the data of wages and prices down to 1890 and 1891, and to carry back the data of wages only to 1840 and 1850. In dealing with prices and the purchasing power of wages I am under the necessity of accepting the well-ascertained facts, derived from very many wholesale lists, that the prices of the necessities of life in 1890 were substantially the same as they were in 1849 and 1850, at the time of the great discoveries of gold in California and Australia. The somewhat incomplete data for 1850 in the census volume sustain these general conclusions.

The accompanying analysis of progress in the rate of wages was therefore made first on my own insufficient investigation; it has next been verified by the tenth census; and is now substantially sustained by Commissioner Wright's report. I am satisfied that the margin of error is very small, and I shall await with confidence the more complete compilation of the data of those wonderful volumes in the Finance Committee's Report which will soon be made. We shall then have more light upon the true relations between labor and capital than has heretofore been possible in this country.

In dealing with this table, however, the depreciation of the paper currency from 1862 to 1878 inclusive must be carefully regarded. The true progress of all who were occupied for gain in this period can only be measured by some other standard than the paper dollar or unit of money in which the wages were paid. In order to establish this standard for a true comparison, I have made out a multiple standard, consisting of uniform quantities of the staple articles of food, fuel, and materials for clothing at their cost in the money of each period. Rent, or the cost of shelter, can not be reduced to so uniform a standard, because of the variations in climate and conditions by which it is affected. The price of shelter comes to only about fifteen per cent of the whole cost of living among the classes that are dealt with in these tables. The price of food materials, on the other hand, is forty to sixty per cent, varying in proportion to the income and according to the grade of the workman, and also varying somewhat with the

section of the country in which the work is done. Those who earn the least pay the largest proportionate part of that income for food material. The wages which are dealt with in these tables, compiled from the Finance Report, are taken mainly in the Eastern and Middle States. The wages taken from the tenth census cover a wider area of country.

Suffice it, that on whatever line of investigation this subject is taken up, the rule is established that I have previously stated. It may even be established in dealing with some arts in which there has apparently been a reduction in wages from one period to another. When these specific lines of work are investigated, it is proved in every instance that some invention has made it possible to employ a lower grade of labor than had been previously required. This has not led to the degradation of those previously employed; they have gone up to higher planes of industry.

Reference may be made to the table in which the earnings of weavers in a Rhode Island woolen factory are tabulated, although this is not an example of reduction in wages. It will be remarked that in 1840 the earnings of men and women alike, working fourteen hours a day, were only four and a half cents an hour; for many years they averaged only five cents an hour for fourteen hours a day, or seventy cents a day. They are now over thirteen cents an hour for ten hours' work; but the farmers' sons and daughters of New England who worked in woolen and cotton factories from 1840 to 1850 are no longer there, even at the higher rates of earnings. They have passed up into occupations less arduous and more lucrative. Their places are filled by a class of operatives who, in 1840 to 1850, possessed neither the mental nor even the bodily capacity to do the work as it was necessary to have it done forty years ago. The machinery was then far less automatic, and the product depended as much on the weaver as it did upon the loom, or even more.

The writer has only been able to make use of proof sheets of Commissioner Wright's report on behalf of the Finance Committee of the Senate, which is not yet even published, in sustaining conclusions previously reached from other data. A thorough digest of this report will require a great deal of time on the part of competent men who can deal with it with full comprehension of its importance. The science of statistics is becoming well established. The community is beginning to learn that figures do not lie except when liars make the figures, although

they sometimes mislead the incompetent when they are incomplete.

The admirable work which is being accomplished in this and other countries by the State and National Bureaus of Statistics will soon furnish a basis for an effective science of political economy. As yet, a very large part of the work of economic writers has been rather barren in results, for want of a broad and well-assured basis for inductive reasoning.

It will be observed that, as capital became more abundant as well as more effective between 1840 and 1860, the hours of labor were shortened and wages increased; this progress in welfare beginning by a reduction from fourteen hours a day, and coming down to eleven before there was any effective legislation limiting the hours of labor or any trades unions of any influence. Presently the evil effects of long hours in the factory upon children and young persons began to attract attention, rendering legislation for their protection necessary or expedient. During the civil war great changes occurred, especially in the occupations of women. At various periods acts have been passed in different States by which the attempt is made to regulate hours and conditions of work. To what extent such legislation or the regulations of trades unions have promoted or retarded general progress in all the arts, it is not my province to deal in this treatise. My purpose has been simply to present the facts in a plain and simple way.

I have ventured to compute the price that we have paid for personal liberty in the United States at its measure in money. No man may venture to estimate the price in the life-blood of the citizens. In the table in which I have made this computation it appears that, without including the expenditures of the Southern States in attempting to resist the principle of personal liberty and to prevent this nation being established consistently with the Declaration of Independence, the money cost will have been ten billion dollars, of which all but a tithe will have been paid in a single generation, from 1865 to 1900. When viewed in the light of billions the cost seems heavy. What did it amount to?

The average population existing between 1865 and 1900 will have numbered more than fifty millions. The average product *per capita* in 1880 was approximately two hundred dollars' worth per head. Before that date it was a little less. At present it is more, and each dollar's worth is more than it was even in 1880. On this computation the price of personal liberty represents only the cost of a single year's product, one year out of thirty-five.

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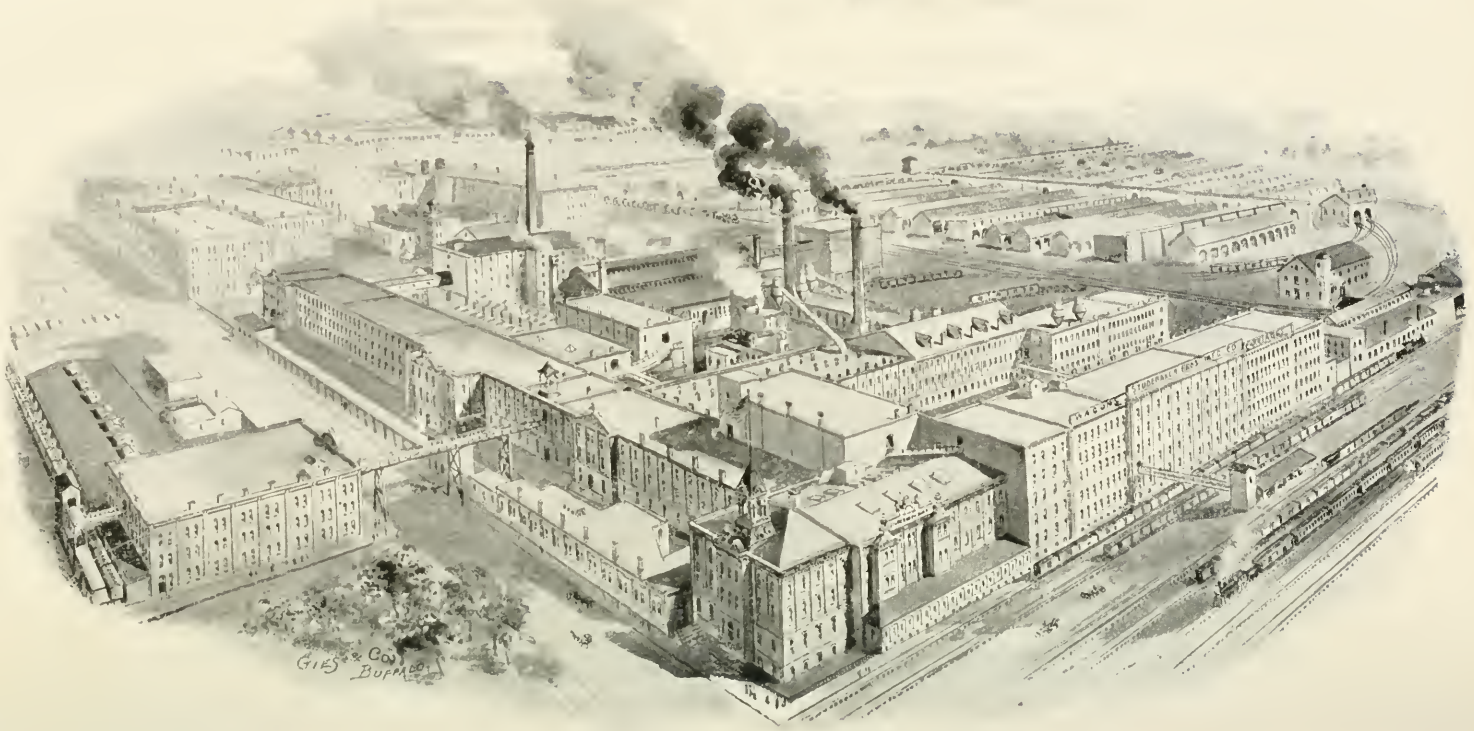


Typical American industries.—Studebaker Wagon Works, South Bend, Indiana.

Again, I have called your attention to the fact that, had the railways of the United States, from 1883 to 1892, charged the price for their service which was considered very low from 1865 to 1869, the difference as compared to what they did charge would have come to eleven thousand million dollars—a billion dollars more than the money price of liberty.

We are near the end of the century in which the great forces of the universe have been controlled and directed to the service of mankind more fully than in any other period in our history; yet what we have seen is but the shadow of what we shall see in the development of the yet more potent manifestations of energy which we are but beginning to control.

The responsibility for the right conduct of this work rests more upon the people of this nation than upon any other. That responsibility may be shared with us by the English-speaking people of the world. To them has been given the chief custody and control of broad and fertile land, of iron, and of coal. Thus far the progress of the English-speaking people throughout the world—yet more the progress of the greater branch in this country—has been made in the periods in which there has been the least control of affairs by classes, and when the greatest responsibility has been placed upon the masses.

The dawn of a similar change upon the continent of Europe may now be witnessed. The strike of the workmen of Belgium for suffrage rather than for higher wages is ominous. The resistance of the people of Germany to further taxation for the support of great armies is now being manifested. What will be the end of the conditions of passive war when armies become as impossible of support as governments are incapable of disarming them, no one can yet imagine.

Upon the people of this nation rests the chief responsibility for sustaining popular government established upon the unit of the family, and sustained by the maintenance of personal liberty, without interference with the freely chosen pursuits of the people so long as each one respects the rights of all others in the control of their own property, of their own time, and of the products of their own labor.

To governments in their corporate capacity may be delegated only such constructive work as can be done by state and municipal corporations more effectually and at less cost than it can be done through any other combination or in any other way. The more democratic the state, in the philosophical use of that word,

the greater benefit of government to the individual citizen. It behooves the individual citizens themselves to beware of private combinations, under whatever name they may be established, whether trusts or trades unions, by which a class either of capitalists or workmen may attempt to restrict competition and impair the freedom of their fellow-workmen who do not join their special organizations. Trusts and unions alike which attempt to establish a monopoly of products or a monopoly of work contain within themselves the seeds of their own dissolution.

We have subtle dangers yet to meet. We may not dread them. Personal liberty has been assured and freedom is established throughout our broad land. It will be sustained.

In order not to confuse the reader, I have omitted to cite the authorities for the compilations and statistics upon which these tables are based upon the respective pages. They are as follows:

Reports made by Commissioner Carroll D. Wright for the Finance Committee of the United States Senate.

The tenth volume of the Census of the United States, Census of 1890, compiled by Mr. Joseph D. Weeks, of Pittsburg.

The Actuary of the Treasury Department of the United States, on Statistics of Population.

Treasury Reports of the United States.

Statistical Abstract and other reports compiled in the Bureau of Statistics of the Treasury Department.

Reports of the United States Commissioner of Pensions.

Reports of the United States Commissioner of Education.

Agricultural Reports, Department of Agriculture.

Cotton Facts, Mr. A. B. Shepperson, New York.

Reports of the Iron and Steel Association, Mr. James M. Swank, Secretary.

Railway Manual, Messrs. H. V. and H. W. Poor.

The Insurance Monitor, Mr. C. C. Hine, editor.

Report of the New York Produce Exchange.

Mr. F. N. Barrett, editor of the American Grocer.

Messrs. Burnham, Parry, Williams & Co., of the Baldwin Locomotive Works.

The Deere Plow Company.

Mr. S. T. K. Prime, of Dwight, Ill.

I am indebted to the various officials in the departments and their assistants, and to the gentlemen whom I have named, for constant courtesy and attention. Without their personal assistance this work could not have been done, and to them the credit is mainly due. It has but been my privilege to bring into more popular notice the condensed results of their long and arduous labors.

CHAPTER II.

TRANSPORTATION.

Its Place in Modern Life.

At about the period of the Revolution that gave birth to our republic there began another revolution, in its origin not political but industrial, much slower in its progress but productive of results quite as momentous. Working by means of changes in the manual and mechanical processes by which men minister to one another and earn their daily bread, its results affected the mass of men more directly if not more vitally than any political changes could possibly do. While the political problems attending the organization of a new republic under unprecedented conditions and upon a nobler plan may be said to have been in a manner solved by a century of experience, the problems proposed to mankind as the result of the industrial revolution are but now beginning to be appreciated in their true importance, and to occupy a chief place in public attention.

The history of this movement would embrace, directly or indirectly, an account of all that chiefly distinguishes the nineteenth century from the eighteenth, the old *régime* from the new. It would include an account of the origin and rise of the factory system of industry, replacing the home work or small and scattered workshops of the old time by the aggregation of men and machinery at industrial centers. It would be much concerned with the discovery and perfection of the steam engine, the mighty prime mover in these changes, and after that with the discovery and development of its chief modes of application to the spindle, the weaving-frame, the forge, the printing-press, the mill, and innumerable other instruments of production; to the railway, the steamship, and other means of transportation and communication.

But only in its origin is the revolution exclusively industrial, and in the next stage are seen its immediate effects upon human life, of which perhaps the most important spring from the aggregation of industries and consequently of men in cities, accompa-

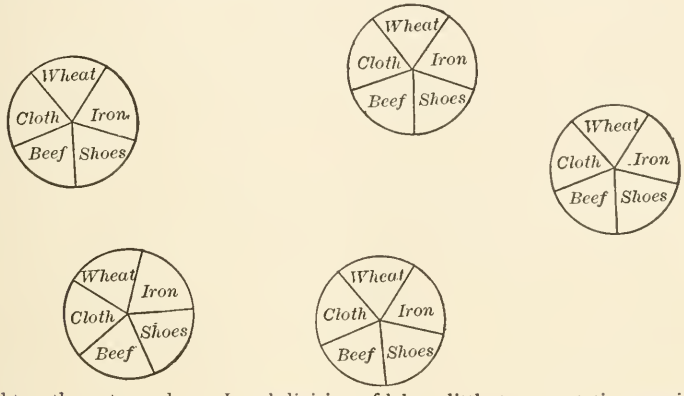
nied by a relative diminution of the number of tillers of the soil, and the separation of producers into two distinct classes, the capitalist or organizing and directing class and the manual laborers. A mind subtle enough might trace a third and more remote series of effects to the same causes. The thought of our time, whether taking the form of literature, science, the fine arts, or political discussion, is evidently molded in great measure by the spectacle of the industrial revolution and of the phenomena induced by it.

None of these changes are more characteristic or more indispensable to the state of society that we now see around us than those in the methods of moving men and things from one place to another, and of communication between men in places distant from one another. The change in industrial organization involves, above all, a greater dependence of each class of men upon other classes, and therefore a necessity for more frequent interchange of goods. The manufacturing class, formerly to a great degree scattered over the country as small handicraftsmen, have now separated entirely from the agricultural class and gathered in factories in the great towns. Therefore the products of the loom, the mill, and the forge, which formerly, if not actually produced upon the farmer's premises, were to be had near at hand, must now be brought from the more distant town, and the farm products exchanged for them must traverse the same distance. One need only visit Mount Vernon to see an illustration of this change. George Washington lived upon his estate surrounded by small handicraftsmen, and as regards the commoner needs of daily life almost entirely independent of transportation. Not only did he raise the food stuffs for his own consumption and that of his numerous dependents, but blacksmiths, shoemakers, tailors, and carpenters were found among the slaves upon his plantation, and cloth for the coarser sort of garments was spun and woven in his household. Nowadays country gentlemen usually live near a railroad station, and have their supplies sent out every week or oftener from the nearest large town, perhaps a hundred miles away.

Still more important to the study of transportation than this withdrawal of the manufacturing classes into towns is the specialization of manufactures by districts—what has been called the territorial division of labor. The principle that one can accomplish most by concentrating his energies on the thing that he is best fitted to do has in our time been applied to places as well as to persons. Massachusetts has districts whose people are almost

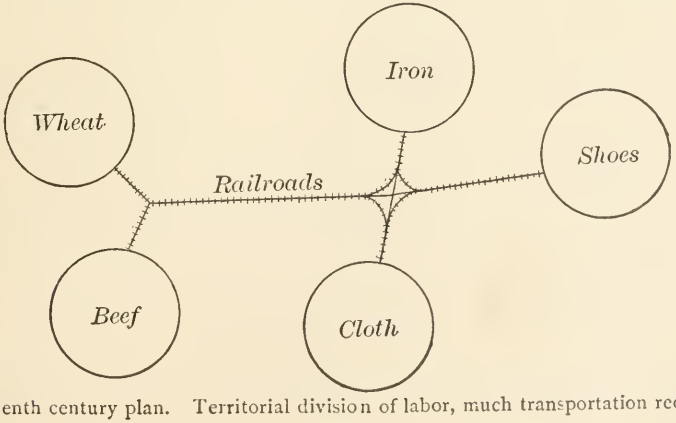
wholly occupied with shoemaking, and others where they are equally engrossed in cotton-spinning. Pittsburg and the surrounding country is, roughly speaking, a vast iron furnace, Dakota a wheat field, and so on. In this segregation, this getting together by themselves of industries, we have the chief cause of the importance of transportation to the present industrial life, the taproot of interstate commerce.

The old industrial order might be represented by a number of small circles, each one standing for the people of a particular district and marked off into segments to show the various industries in which they are engaged: thus,



Eighteenth century plan. Local division of labor, little transportation required.

In this case each district engages in a variety of industries, and there is no need to bring commodities from a distance. Under the modern order each of these districts finds it to its advantage to concentrate its energy upon some one commodity: thus,



Nineteenth century plan. Territorial division of labor, much transportation required.

Clearly the various districts are now no longer self-sufficient, but all are dependent on the first for wheat, on the second for iron, and so forth. Four fifths of the whole amount produced must be carried from one district to another.

The application of this principle is not confined to any one country. In its broader working it is the foundation of international commerce. Our wheat, our beef, our petroleum, our raw cotton, produced in great excess of our needs, are carried abroad on all seas, while England is the world's cotton factory, and France and Italy are the lands of silk, wine, and olive groves.

It is worth while to reflect where and why the eighteenth century means of transportation failed to meet the needs of the industrial revolution, and how, speaking generally, their deficiencies were overcome. The excellence of transportation may be said to depend on efficiency in four particulars, namely, capacity, cheapness, rapidity, and independence of the natural features of the earth's surface. The old methods of carts, caravans, and pack-saddles by land, and of wind-driven vessels by water, were hopelessly deficient in all these particulars; and the improvements of the present century, various as they are in detail, may nearly all be classed as betterments in some one of them. Looking first at transportation by water, one can see that progress has been chiefly in the attainment of more speed and greater independence of natural features. The invention and perfection of the steamship has been the chief agent in increasing speed, reducing the time between New York and Liverpool from, say, six weeks to as many days. The surmounting of natural obstacles is seen not only in the complete independence of winds enjoyed by steam vessels, but—an equally important instance—in the overcoming of river currents, opening to inland navigation vast regions not otherwise accessible by it. The navigation of the Mississippi River and its tributary streams, highways into the largest and richest watershed in the world, is almost wholly dependent upon steam; so with the upper courses of all our great rivers. Indeed, inland channels are, generally speaking, impracticable for sailing vessels, and, barring the use of steam, must be traversed chiefly by vessels towed, floated with the current, or propelled by oars—all methods subject to many disadvantages and frequently altogether inapplicable. Nor is steam the only agent in making water transportation less dependent on natural features. The deepening of rivers and the construction of canals, works receiving their greatest impetus from the needs springing out of the industrial revolution, opened

new inland transportation routes of the utmost importance, and, next to the invention of railroads, are probably the greatest modern achievement in the advancement of transportation.

On land, progress has been even greater, and concerns all four of the factors that determine the efficiency of transportation. The old way of moving things—by camels, horses, and asses—was from its very nature so slow, so costly, and of so little capacity, that it could do almost nothing to meet the transportation requirements of the new industrial *régime*. In fact, before the introduction of railroads there was no long-distance land transportation of any commodities except such as were of great value as compared with their bulk, and the possibility of an extensive commerce was confined strictly to the water routes. The railroad overcame, almost at a leap, the before insurmountable obstacles to adequate land transportation. It was a triumph over the earth's rugged surface, as well as a revolution in all that concerns cheapness, rapidity, and capacity.

It is plain, then, that the railroad, the most characteristic and remarkable feature of nineteenth century transportation, is not, as some imagine, the outcome of a bright thought which happened to be hit upon in the early part of this century, but that might have been discovered and carried out a thousand years ago had there been in that time mechanics as enterprising as Watt and Stephenson. On the contrary, it is inseparably bound up with the other industrial changes of the time—in part their effect, in part their cause—an indispensable factor in the industrial revolution. Our railroads came into being as the definite answer to definite industrial requirements, and, by the brilliant manner in which they meet these requirements, have reacted incalculably on all departments of life. The development of great inland cities like Denver and Kansas City, the opening up to profitable culture of vast areas of land inaccessible by water, the enormous augmentation in the movement of persons from place to place, the quick interchange of thought throughout the world, causing a more vital self-consciousness in nations and facilitating the unity of great political aggregates like the United States, these are only a few of the more obvious of those features of the life of to-day that did not originally belong to the industrial revolution, but were added to it as secondary and unforeseen results of changes in transportation.

Transportation, as we know it, is something as diverse and complicated as the highly developed society that it serves. We

use all the old ways and many new ones. Besides many times the number of beasts of burden that our ancestors had, and an infinite variety of better vehicles, we have railroads and steamships, street railways, bicycles, pipe lines, telegraphs, and telephones. Each of these is the means by which something is moved from one place to another in such quantity as to make the movement of some importance to social or industrial life. It does not matter that in the case of telephones and telegraphs the thing moved is nothing material. For practical purposes that which passes over the wires is thought, and there is nothing whose transportation is more important.

Some light upon the relation of these various sorts of transportation to one another comes when one reflects that the modern organization of society already spoken of naturally calls for two pretty distinct kinds of movement. The first is the local movement necessarily taking place between each industrial center and the country round about it. Every considerable town is a point of collection and distribution. It draws in the farmer's grain, cattle, and other products, and it sends out the clothing, farming implements, etc., that he gets in exchange. In the great city it is the manufactured articles, from the factories and warehouses scattered over the city and its neighborhood, that are collected; while the farm products, and whatever else is brought from a long distance, are distributed in and about the city. Here there is also a movement of persons to and from the center independently of the movement of commodities. The crowding of industries in such cities makes it impossible that people should live near their work; and thousands—in the largest cities hundreds of thousands—have to be carried in to their work in the morning and out to their homes at night. Second is the longer movement of commodities from city to city and from State to State, including all that is more commonly thought of as transportation. Among the means for accomplishing the first kind of transportation are the farmers' wagons and the country roads they travel over, city pavements, carts, trucks and delivery wagons, street and elevated railways. The chief agencies in the second kind are railroad tracks and cars, boats, rivers, lakes, and canals. Thought-carriage by telegraphs, telephones, and the mail is something so peculiar that it seems best to class it by itself as a third kind of transportation.

Let us take up the second kind first.

Railroads and Water Ways.

Before the introduction of railroads the most important achievement in the improvement of internal transportation in this country was the construction of the Erie Canal, completed in 1825. This canal, reaching from the Hudson at Albany to Lake Erie at Buffalo, opened a line of cheap transportation to the previously almost inaccessible Northwest. Along its line cities sprang up in what had been a wilderness, and the development of the vast regions beyond was greatly stimulated. For about twenty-five years the traffic over this canal, large from the first, continued rapidly to increase. During this period it was the most important feature of the internal transportation of the country. Soon after 1850 it began to meet the competition of the railroads, and after maintaining the conflict for about twenty years it was practically vanquished. It is still of considerable service for certain kinds of transportation, but the traffic over it is small compared with that of the railroads, and this notwithstanding the fact that the canal is supported by taxation and that tolls upon it have been abolished. The history of this canal may stand for that of many others, some of them scarcely inferior to it in their original importance. Leaving aside the ship canals, which answer quite a different purpose, they have been forced by the railroads into a very subordinate position.

The year 1830, perhaps more accurately than any other, may be fixed on as that of the birth of the railroad. In that year the Liverpool and Manchester Railroad was opened, and traversed by one of George Stephenson's locomotives at a speed of thirty-five miles an hour, while the killing by the cars of the great and good statesman Huskisson, a chief promoter of the enterprise, made the occasion ever memorable in English history. In the same year was completed about fifteen miles of the Baltimore and Ohio, the first important road built in the United States.

At the end of the first decade notable progress had been made. In 1840 there were, besides some twenty disconnected lines scattered over the Eastern States and even as far west as Michigan, two considerable systems, the one centering at Boston, the other at Philadelphia. The former reached the chief New England towns, from Stonington, Connecticut, to Portsmouth, New Hampshire. The latter connected New York, Philadelphia, Washington, and Baltimore. A long line, almost continuous with this,

extended south from Fredericksburg, Virginia, to Wilmington, North Carolina.

These first meshes of the network which now covers the United States were systems in no other sense than that the tracks were connected. They were owned and operated by many different companies, among whom there was for the most part no close business relation. The promoters of the earlier railroads were far from foreseeing the importance that was afterward to belong to the carriage of commodities over long distances. The first lines were local in their aims, connecting two or more neighboring cities, or opening outlets to the sea from the coal regions of Pennsylvania and West Virginia. The through routes came about by the gradual growing together of these disconnected lines. The lines now forming the New York Central, for example, began with a road from Albany to Schenectady, opened in 1831, and grew in an irregular manner both ways, until finally New York and Buffalo were united in 1842.

By 1850 there was through communication from New York to Boston by the Boston and Albany, and from New York to Buffalo by the New York Central; the Michigan Central extended from Detroit nearly to Chicago, and Ohio was traversed by a line from Cincinnati to Sandusky. Some small beginning at least had been made in nearly every State east of the Mississippi. Between 1850 and 1860 the growth was chiefly in the Western Middle States—Ohio, Indiana, and Illinois. The Alleghanies were passed by the Pennsylvania and Baltimore and Ohio roads, and a network of roads spread itself over the rich and comparatively level regions beyond. During the same period through rail communication was opened from New Orleans to the upper Mississippi Valley, and from Memphis by way of Atlanta to Savannah, and by way of Knoxville to Richmond and Washington.

The foremost achievement of the next decade in railroad building was the joining of the Atlantic and Pacific seaboards by the Union Pacific Railroad, opened in 1869—a work looked upon as essential to the political unity of the two coasts, and carried out largely by means of subsidies and land grants from the United States. Of late years construction has been general over the whole country, though naturally most rapid in the newer States. Minnesota, the valley of the Missouri, and the Southwest have at various times been the theaters of particularly active building, while several new lines have been opened

to the Pacific coast. More recently the Southeast has shown a very marked activity.

Thus have we dealt with the natural difficulty of moving things rapidly and in sufficient quantity over the rough and refractory surface of the continent. A web of steel roads has been spun over the face of the land; and wherever men come together in sufficient numbers prepared to produce something useful, the railway is at hand to carry it to market for them or to bring back whatever they wish to have in exchange. However, the mere laying down of tracks makes but a small part of the history of railroad growth. The length of railways in the United States is now somewhat more than three times what it was in 1870, but the capacity to move freight and passengers has increased at an even greater rate—is about six times what it then was. This growth of capacity, as compared with length, comes chiefly from using more cars upon a given length of road, and from increasing the carrying capacity of each car. There has been, too, a steady though slow increase in the speed not only of passenger but—a matter of equal importance—of freight cars. Not only does a rapid movement of freight cars make it possible to move more freight in the same time, but the quick delivery that it insures is of incalculable advantage to business. Prices are continually varying, and the man who orders a shipment of goods usually wants them at the earliest possible moment, in order that he may not miss the favorable state of the market. A few days' delay may upset all his calculations. Then, many commodities can not be transported at all except at high speeds. Dressed meat and other perishable supplies must be moved rapidly. Speed alone makes distant commerce in them possible.

These changes have not been accomplished merely by building more and larger cars, and by running the engine faster. Heavier and faster trains require new and stronger engines, better brakes for quick stopping, rails heavier and of better material, more secure fastenings, fewer curves, a more solid roadbed, new bridges, a double track, and a hundred other improvements.

But doubtless the greatest achievement has been in the cheapening of transportation. When railways were first introduced it was by no means supposed that they could compete with canals in moving heavy commodities. They were to transport rapidly passengers and light freight, and to serve regions where canals could not be built except at too great a cost. In the sequel,

however, it has turned out that, while natural routes of water transportation, as lakes and navigable rivers, can successfully compete with railroads for the carriage of the heavier kinds of freight, canals can seldom do so except at a loss. In England, however, where railroad rates average much higher than here, there are signs of something like a revival in canal transportation.

The cheapening of rail movement was brought about by the working together of numerous improvements in every department of operation. In general, it may be said that the development of the country required cheap transportation, and that the ingenuity and enterprise of mechanics, managers, and capitalists found a way to supply it. The average charge for carrying one ton of freight one mile is now a little less than one cent. In the decade 1850–'60 it was three cents or more. On grain and other heavy staples the reduction has been even greater.

A large part of the change was due to the technical improvements above mentioned. The expense of better roadbed, tracks, and cars has been far more than made up by the gain in capacity and durability. Of all the changes of this sort, the substitution of steel rails for iron had the most momentous consequences. This substitution took place chiefly between 1870 and 1880, and followed the discovery of processes of manufacturing mild or soft steel at a cost little or no greater than that of wrought iron. This discovery, which has worked a revolution in shipbuilding as well as in railroad building, was the paramount influence in cheapening transportation. The new material not only effected an enormous saving in the cost of repairs, but made practicable a speed and weight of trains impossible upon iron roads. The natural increase in the volume of traffic had also much to do with lowering the cost of carriage. In the case of railroads, as of many other industries, the more business is done the cheaper it can be done. An unprofitable traffic was often dealt with by lowering the rates, until shipments were so greatly increased that even at the lower rates they could be handled at a profit. Another important and, as far as economy in transportation is concerned, a very beneficial change has been the rapid consolidation or bringing together under one management of many small railroads. Such consolidation has been followed by those economies that always result from more perfect and comprehensive organization. Throughout the great system controlling several thousand miles of railroad, all under a single general management, the processes of transporta-

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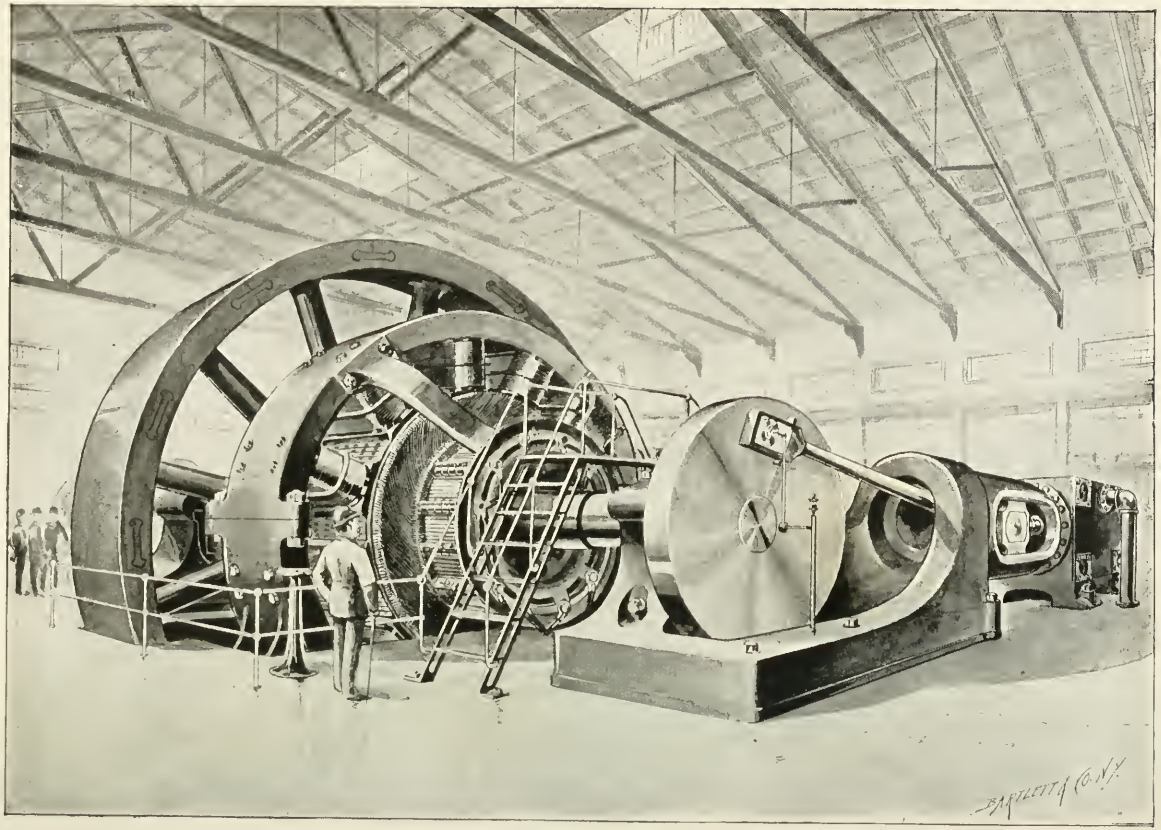

Generator, Intramural Railway, World's Columbian Exposition

tion may be carried on in a uniform manner and with a common purpose. In the shops thousands of cars and hundreds of engines are made just alike, and with interchangeable parts. The work of the rolling mills where the rails are turned out is upon the largest and therefore the most economical scale. So with all the needful appliances. Switches, signals, brakes, couplers, etc., are contracted for upon the most advantageous terms. Costly excavating tools, and a hundred other expensive improvements which a small line could not adopt, are used with the greatest advantage. It is as inevitable that railroads should be aggregated into systems as that plows should be made in factories rather than by the village blacksmith, or cloth in mills rather than upon the distaff and hand loom.

Closely connected with the general cheapening of transportation, and equally important in its effects upon traffic, is that complicated adjustment of rates to the conditions of commerce which is so prominent a feature of modern railroad working. This matter is so bound up with recent controversies and legislation concerning railroads that it will be treated later in connection with those subjects.

To-day the United States possesses by far the most imposing and efficient system of internal transportation that the world can show. All over our vast territory stretch the railroads, apparently indifferent to mountain ranges and other natural obstructions, rivaling in length and in capacity for moving persons and commodities those of all the rest of the world together. Along our seacoasts and upon our lakes, rivers, and artificial water ways moves a various and almost innumerable fleet of water craft, quite beyond comparison, as regards number, capacity, or the swiftness and elegance of the passenger boats, with anything to be found elsewhere. Only as regards the means of transportation upon the high seas does our country occupy other than the first place. Indeed the operations on our inland water routes rival those on the most frequented highways of international commerce. More tons of freight, for example, pass through the Saint Mary's Falls or "Soo" Canal, connecting Lake Superior with the lower lakes, than pass through the Suez Canal, the highway between Europe and the Orient, while the Detroit River probably carries a heavier commerce than any other water way in the world.

Our railways carry from three to four times as many tons of freight as our water ways. As regards equipment, there are about

forty times as many cars as there are water craft, and about five times as many locomotives as steam vessels.*

The greater part of the commodities and persons that are carried by railroad necessarily go in that way because there is no water route between their starting place and destination. But on the other hand, where there is a water route—as between Detroit and Buffalo, for example—there is in almost every case a railroad also, so that there is a choice between the two. What determines this choice? Although to answer this question in detail would not be easy or even possible, it may be said, in a general way, that the choice is determined by the greater speed of land transportation and the smaller cost of water transportation. These two considerations fix for the most part the character of water transportation. The railroads are of course affected by them only where they come into competition with the water routes. The first consideration causes almost all passenger travel to fall to the railroads. To be sure, many passengers at certain seasons choose the water routes, but in comparison with the total movement their number is insignificant. Speed—that the journey be quickly got through with—is what travelers chiefly require, though for the sake of picturesque scenery, greater comfort, or the sea air, they may sometimes forego it. The second consideration determines that, where quick delivery is not considered important, the cheapest and bulkiest commodities, such as it would not pay to move except at the smallest cost, shall tend to go by water. As a matter of fact, water transportation, where there is a choice between water and rail, is almost exclusively confined to such commodities. The freight carried on the Great Lakes consists almost entirely of lumber, ore, coal, grain, and stone. On the Ohio and Mississippi Rivers the greatest tonnage is in coal, brought down in fleets of barges from Pittsburg and its vicinity, and in lumber. On the Atlantic coast, coal, lumber, ice, and stone are the staples.

In 1891 the length of railroads in the United States was over

* Following are the comparative figures for 1890, as given in the statistical report of the Interstate Commerce Commission, and in Census Bulletin No. 179:

	Railroads.	Water ways.
Number of cars or water craft	1,169,667	25,540
Number of locomotive or steam vessels	30,140	6,067
Number of tons of freight moved	636,541,617	172,110,423
Number of employees	749,301	106,436

168,000 miles, enough to put six girdles round the earth and some to spare. Over a million cars were drawn hither and thither by thirty thousand locomotives. The passenger trains ran more than thrice the distance between the earth and the sun, and the freight trains half as far again. The number of persons riding was over half a billion, or eight times the population of the country. Over 600,000,000 tons of freight were carried. To do this work required 780,000 men, about one in sixteen of the total adult male population of the country. The earnings of all the roads were over $1,000,000,000, the operating expenses $700,000,000, the capital about $10,000,000,000.*

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* *Some Railway Statistics.*

(Abridged from the statistical report of the Interstate Commerce Commission for 1891.)

LINE AND EQUIPMENT.

Length of line, in miles	168,402
Number of passenger locomotives	8,901
Number of freight and other locomotives	23,238
Total number of locomotives	32,139
Number of passenger cars	27,949
Number of freight and other cars	1,187,662
Total number of cars	1,215,611

MEN EMPLOYED.

Total number	784,285

CAPITAL INVESTED.

Capital stock	$4,450,649,027
Funded debt	4,840,266,412
Other debt	538,559,576
Total capital	$9,829,475,015

RATE OF DIVIDENDS ON STOCK.

2,654 millions	pay no dividend.	227 millions	pay from 6 to 7 per cent.
63 "	" from 1 to 2 per cent.	204 "	" " 7 " 8 "
129 "	" " 2 " 3 "	92 "	" " 8 " 9 "
159 "	" " 3 " 4 "	22 "	" " 9 " 10 "
437 "	" " 4 " 5 "	83 "	" over 10 per cent.
380 "	" " 5 " 6 "		

PUBLIC SERVICE OF RAILWAYS.

Number of passengers carried	531,183,998
Miles run by passenger trains	307,927,928
Average number of passengers on a train	42
Average distance traveled by each passenger (miles)	24.18
Number of tons of freight carried	675,608,323
Miles run by freight trains	446,274,508
Average number of tons on a train	181.67
Average distance each ton is hauled (miles)	120.00

If the railway men are an army in numbers, their work is as fatal as a battle: 2,660 were killed and 26,140 wounded during the year in question. Of passengers, 293 were killed and 2,972 wounded; of other persons, 4,076 were killed and 4,769 wounded.

Such are some of the dimensions to which the once simple business of moving things and persons from one place to another has grown as a result of the industrial revolution and the territorial division of labor. There is no occasion, however, for being browbeaten or mystified by the bigness of these numbers. These great operations are made up of simple elements, and are but the reflection, however magnified, of the ordinary needs of men, and of the fact that the things needed must usually be brought from a distance. Grain and flour for bread, wool and cotton for clothing, coal for heating and manufactures, stone and lumber for building, live stock and dressed meats, petroleum, iron—these, either in their raw state or manufactured, make the bulk of the freight, while the men go about in great part to attend to the producing and distributing of these things.

EARNINGS AND INCOME.

Passenger revenue	$281,178,599
Mail	24,870,015
Express	21,594,349
Other earnings, passenger service	5,382,848
Freight revenue	736,793,699
Other earnings, freight service	3,061,606
Other earnings from operation	23,817,697
Unclassified	62,582
Total earnings from operation	$1,096,761,395
Income from other sources	133,911,126
Total earnings and income	$1,230,672,521

EXPENSES.

Operating expenses	$731,887,893
Interest on debt and other fixed charges	388,707,712
Dividends	96,489,013
Surplus	13,587,903
Total (see Earnings and Income, above)	$1,230,672,521

VARIOUS ITEMS OF INTEREST.

Average charge for carrying a passenger one mile	cents	2.14
Average cost of the same	"	1.91
Average charge for carrying a ton of freight one mile	"	0.89
Average cost of the same	"	0.58
Revenue per train-mile, passenger trains	$1.06	
Average cost of running a passenger train one mile	0.80	
Revenue per train-mile, freight trains	1.64	
Average cost of running a freight train one mile	1.06	

The movement of persons amounts, as has been said, to nearly half a billion a year. Twenty-seven thousand passenger cars and nine thousand passenger locomotives are engaged exclusively in this service. Each passenger train, on the average, carries forty-two persons, and the average distance traveled by each person is only twenty-four miles. The passenger traffic is much heavier in the thickly settled States of the northern Atlantic coast than elsewhere. Over one half the entire movement is in New England, New York, Pennsylvania, and New Jersey. The average number of passengers in a train is also greatest here, but the average distance traveled is only about the half of what it is farther west—about sixteen miles against from thirty to eighty in other parts of the country. If we make this Northeastern region include also Ohio, Indiana, and Michigan, it will embrace nearly three fourths of the total passenger movement. About one fourth of what is left is in the Southern States east of the Mississippi, one sixth on the Pacific coast, and the remainder in the middle West—the region bounded on the west by the Rocky Mountains, on the east by Lake Michigan and Indiana, and farther south by the Mississippi River.

The impression is still quite general, particularly among persons having little occasion to travel, that railway riding is dangerous. There is, in fact, much left to be desired in this respect, and statistics show that accidents to passengers are more frequent in this country than in Europe. But the actual danger is surprisingly small, and notwithstanding the frightful calamities that from time to time occur, one who considers the vast extent and complexity of the passenger movement can not but wonder that they are so infrequent. In taking a railway journey the chance of death or injury is about one in 180,000; and by comparing the number of accidents with the distance traveled it may be shown that one might, on the average, travel without stopping for sixteen years at a rate of thirty miles an hour before being in any way injured. It is probable that there are more persons killed and injured by falling down stairs than in traveling by rail. The question of the death and mutilation of employees as a result of the use of imperfect appliances is a much more pressing one, and will be considered in connection with the regulation of railways by law.

The water transportation carried on in the United States requires about 25,500 vessels, exclusive of canal boats. Half of these belong on or near the Atlantic coast, and the greater part of the

remainder in the Mississippi Valley. There are some 6,000 steam and 9,000 sail vessels, the rest being scows and other unrigged craft. The sail vessels belong exclusively to the oceans and the Great Lakes, but over 1,160 steam vessels operate on the Mississippi and its tributary streams. The aggregate freight movement is somewhat over 172,000,000 tons.*

Political Questions—Railway Regulation.

So far the agencies of transportation have been looked at entirely from an industrial point of view. They have been presented as part of a revolution that has taken place chiefly within the present century, and has made over economic society in such a way as to necessitate a far greater movement of persons and com-

* *Statistics of Water Transportation.*

(From Bulletin No. 179 of the Eleventh Census of the United States. The figures do not include canals.)

NUMBER, TONNAGE, AND VALUE OF VESSELS.

	Number.	Tonnage.	Value.
Steam vessels	6,067	1,820,386	$140,813,570
Sailing vessels	8,912	1,795,443	57,324,687
Scows and other unrigged boats	10,561	4,017,847	16,931,039
All vessels	25,540	7,633,676	$215,069,296

GEOGRAPHICAL DISTRIBUTION OF VESSELS.

Part of the Country.	Number of steam vessels.	Number of sailing vessels.	Number of unrigged vessels.
Atlantic slope	2,713	6,490	3,250
Gulf of Mexico	220	613	175
Pacific slope	531	822	489
Great Lakes	1,489	987	308
Mississippi Valley	1,114	...	6,339
The United States	6,067	8,912	10,561

GEOGRAPHICAL DISTRIBUTION OF FREIGHT MOVEMENT.

Part of the Country.	Tons of freight moved.
Atlantic slope	77,597,626
Gulf of Mexico	2,864,956
Pacific slope	8,818,363
Great Lakes	53,424,432
Mississippi Valley	29,405,046
The United States	172,110,423

MEN EMPLOYED.

Total number	106,436

modities than would have been conceivable under the old order. But social revolutions can not be confined in their results to any one aspect of society, and, as already hinted, this one, though industrial in its origin, has deeply influenced morals and politics. Family life, the private relations of men with one another, and the laws by which society is regulated, have all had to adapt themselves more or less to the changed industrial conditions. The changes in law, actual or proposed, are particularly important and interesting, and, as a matter of fact, such of these changes as relate to transportation attract at present more thought and attention from the public than any of the technical or industrial aspects of the subject.

It is an open question to what extent the powers and duties of government and the laws affecting industry must, in the end, be changed to meet the new conditions of economic society. There is a school of writers who maintain that the present organization of industry is fundamentally unjust and wrong, and that the only way effectually to remedy it is for the people as a whole, acting through their governments, to undertake the immediate management of all industrial matters. Others, deprecating this extreme view, hold that certain industries, which they regard as having a peculiarly public character, such as water works, gas works, telegraphs, and even railways, can not safely be intrusted to private hands and should be assumed by the Government. Others are content with demanding that these shall be more strictly regulated by law. On the other hand, many very able thinkers take quite the opposite view, and hold that industrial society is best off and most progressive when most left alone, and that all interference is mistaken and injurious.

What is certain is, that in every progressive country there has been during the present century a series of legal enactments more or less subversive of old ideas about the proper limits of government interference with industry. The famous factory legislation in England, which intervened between the employer and the employed, determining the age at which children might begin to work, and many like matters, was an early and conspicuous instance. In this country there is no example so important and so familiar as that of the State and national laws designed for the regulation of railways.

The question whether business shall not sometimes be regulated by law in matters with which it used to be thought the public had no right to meddle, arises in connection with the railway,

not only because this is an industry quite new and of peculiar importance to all classes of the people, but because, aside from the mere question of transportation, the railway, in the magnitude of its financial operations, the concentration into one or a few brains of the control of vast numbers of manual laborers, and in the peculiar method by which money is raised to pay for it, is the foremost example of some of the most important changes characteristic of the industrial revolution. One of these changes in industrial organization consists in an enormous increase in the number, wealth, and power of the joint-stock companies and corporations formed for the conduct of large enterprises. Another is that revolution in the organization of manual labor that has substituted for scattered groups of handicraftsmen working side by side with the master, a system of industrial armies controlled from the office with the precision of machinery, by masters who know little of the human and individual quality of the instruments with which they work.

Modern industrial enterprises being in many instances too extensive to be carried out by the capital of a single person or even of several persons, a form of association has been devised by which any number of persons may unite in an undertaking, each one having a definite interest, larger or smaller as his means or interest may determine; no one being pecuniarily responsible for the operations of the association beyond a certain definite amount. The corporation or joint-stock company thus formed is recognized by law and permitted to buy, sell, and borrow, make contracts, and carry on industry much like an individual. The funds collected are usually placed for more convenient management in the hands of a few officers, who from time to time give the stockholders an account of their use of the authority intrusted to them. The device is essentially one for securing unity in operations too great for individual resources, and is an admirable one in some respects. One of its advantages is that it enables the poor man to have his part in the most magnificent enterprises on equal terms, as far as his money goes, with the rich.

All other purposes to which this device is put are overshadowed by its use for the construction and operation of railways. There are seventeen hundred and eighty-five railway corporations in the United States, with a capital stock of nearly four and a half billion dollars, and a debt of more than five billion more. Compared with these figures the total operations in any other industry, farming excepted, are small. Naturally, therefore, whatever evil

there may be in the corporate organization of industry is seen on the largest scale in railways, and is perhaps looked on as peculiar to them, when it may, in fact, have nothing to do with transportation as such. Many of the questions in which railways figure are, indeed, corporation questions, and are found wherever the corporation is found. Unfaithfulness of the officers to the interests of the stockholders, and the use of the great power placed in their hands for the furtherance of their own private schemes, is an evil to which all corporations are liable. Another is the manipulation of accounts in such a manner as to conceal these dishonest operations, or, for any other purpose, to conceal from the stockholders the real condition of the enterprise in which they are embarked. A third, from which the public rather than the stockholders suffer, is the swindling of investors by the sale of bonds—that is, by the borrowing of money—for which, as appears in due time, there is no adequate security.

The labor question is also one that, though it may arise most urgently in connection with railroads, does not concern transportation in a peculiar and exceptional manner, but belongs to all modern industry. It is true that a strike, for example, in the railway business is of more momentous concern to the public than one in any other. As people are now distributed, railroad transportation is an essential part of their daily life. Their very bread depends upon it. But this is only a matter of degree. This dependence of industries upon one another penetrates all society. No one branch of production can stop without more or less affecting all others. A strike of coal miners, if of sufficient extent and duration, would quite upset manufactures and trade, and cause incalculable misery and even death.

Those questions relating to the regulation of railways by law that are more properly called railway problems concern matters in which the business is more or less fundamentally different from other businesses. Perhaps the most important of these differences is that the railway is in great part a monopoly, that its transactions are not regulated by free competition. There are, of course, other monopolies, and indeed some economists now hold that all interests that can not be carried on without large capital have something of the monopoly character. The so-called trusts are attempts to restrict the operation of competition in various industries and to substitute for it the principle of monopoly. Yet it is still true that the railroad industry is quite sharply marked off from others by its pronounced and inevitable monopoly character.

This was not perceived when railroads were first built, and it was in the beginning supposed that many people would own and run cars on every railroad, and that there would be free competition among them, just as there may be among stage coaches and freight wagons on a public road. With this end in view, it was especially provided, in granting charters for the building of early English railroads, that the track and the cars should not be owned by the same persons. This plan, however, was a total failure, and could have produced nothing but railroad anarchy. Trains owned and run independently would be continually disputing the road or running into one another. A railroad is a difficult machine to manage at the best, and will run rightly only when each part is carefully adjusted to the whole.

But if free competition is impossible upon a single track, can it not be secured by means of two or more lines connecting the same places? It is well known that upon some important routes of commerce competition of this sort does actually exist in a certain measure; but as a general principle, applicable to all railroad transportation, the failure is as signal in this instance as in the other. Railroads are in their very nature ill adapted to competition. A hundred cotton mills, situated in various parts of the country, may compete for the trade of the same wholesale dealer. But what the railroad has to sell is in its nature local, a matter of a single place. Two railroads can not compete except they come together and occupy as nearly as may be the same ground. To this there are serious objections. In the first place, before a railroad can be built at all, the State must step in and, by exercise of the right of eminent domain, provide land to lay the tracks upon, by compelling the previous occupants to sell, whether they wish to or not. The power of thus interfering with private rights is one to be exercised as little as possible, and only when it is clear that great advantage to the community as a whole is to follow. In fact, speaking generally, no such advantages follow the building of two or more railroads between the same points. Suppose, for example, there is a railroad connecting two cities, and that between these cities there is required an amount of transportation for providing which the railroad charges $400,000. Suppose that $200,000 of this is profit. The road, we may say, cost $1,000,000, and is therefore making twenty per cent. Aware of this exorbitant profit, and dissatisfied with the present rates, the business men in the two cities start an agitation for a competing line. A company is formed, stock is taken, bonds sold, and the new line built. The

new road costs as much as the old one, namely, $1,000,000. The business is now divided between them, and each road earns $200,000, supposing the rates to remain the same as before. Will each road now make ten per cent? Not at all. It costs the old road nearly as much to do $200,000 worth of business as it did to do $400,000 worth. Some economies in operation are possible, some trains may be taken off, some men discharged, but the expense of keeping up the tracks and roadbed, the passenger and freight stations, is about the same. The saving in expense is only, say, $50,000, so that if rates are maintained the expenses of each road will be $150,000, and profits $50,000, or five per cent. But the purpose of encouraging the new road was to effect a reduction in rates. Will the two roads, then, compete and reduce their rates? As neither is making more than a small profit, they will be more likely to combine and raise rates higher than ever. Instead, then, of one prosperous road making a large profit which it might possibly have been induced to share with the public by making lower rates, there are now two unprosperous roads from whom no reduction in rates can reasonably be looked for.

The principle of competition does not, and in the nature of the case can not, have any general application to transportation by rail. The railroad is essentially a monopoly, and, speaking generally, moderation in rates is to be secured not by competition but by some other force—by the pressure of public opinion, by public authority, or by the self-interest of the roads acting through a desire to increase the movement of commodities by offering transportation at a lower price. This last is, in fact, a very important factor in determining railroad rates, and will be spoken of later.

Notwithstanding the failure of competition to act generally in regulating the prices of transportation, it does have a very important existence on the great through routes of traffic; though whether, even in this case, it has a beneficial influence on prices is not very clear. As some of the most important railway problems arise in connection with this sort of competition, it may be well to examine it in some detail.

It has already been pointed out that the railroad alone renders possible any considerable development of long-distance carriage by land. This sort of transportation has, in fact, grown with the growth of railroads and made great gains with every new economy in their operation. As the country developed in population and wealth, the railroads, built in the first instance for local traffic, began to find themselves highways of more distant communica-

tion. The importance of the through as compared with the local traffic increased steadily as time went on. When, by the piecing together of many local lines, through communication was established between New York and Chicago, one of the most important of the natural routes of commerce between the interior and the seaboard was opened. The first through line between these cities went by way of Buffalo, the roads forming it being among those that now make part of the New York Central or Vanderbilt system. Chicago was also approached about the same time from slightly different directions. Other local roads farther to the south, beginning with the Pennsylvania and with the Baltimore and Ohio, were being pieced together in a similar manner and reaching out in the same direction. In time they attained the same point. These long lines of track were still, as to their ownership and organization, only a patchwork of small roads. The Erie Canal was still so much the cheapest route of through traffic, that comparatively little of it went by rail. It was soon seen, however, that the through movement was destined to a great increase, especially if helped on by a reduction in rates. This reduction soon began, made possible by those economies in operation and management already mentioned, one of the earliest being that effected by the consolidation of the short roads into a few large systems. As this consolidation went on, as rates gradually went down, and the long-distance traffic increased, competition for it sprang up among the through lines. The abler heads engaged in railroad management soon saw that this competition, for what was clearly destined to become an important part of their business, could be carried on to the best advantage only by such railroads as should secure control of a through line from the West to the seaboard. Accordingly, the principal roads, under the leadership of such men of organizing genius as Cornelius Vanderbilt and Thomas A. Scott, pushed their operations westward, and sought to gain this end, sometimes by building new roads, but oftener by getting control of the old ones.

These operations, though slow, were in time successful, and were accompanied and followed by others of a similar sort all over the country. Before long there were completed five through lines from Chicago to the Atlantic seaboard, each one under a single control. What took place over this route took place to a greater or less degree on all the main highways of commerce. From the seaboard to St. Louis and the Southwest, from Chicago to the Missouri River, from the Missouri River to

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Elevated Railroad, New York.

the Pacific coast, became through routes, upon which several lines of railway, each one under a single control, contended for the carriage of the through traffic.

As soon as the first two through lines to Chicago were completed, earnest competition began between them. Rates fell to a quarter or less of what they had been, and the expression "railroad wars" began to grow familiar. A railroad war is understood to mean a competition so reckless that the railroads engaged in it carry freight and passengers at rates so low as to seem to have no connection with the expense of running the trains or with any other legitimate business consideration, but to be made with regard only to a wild eagerness to get the business away from the other roads at any cost. Of course, it is only the through or competitive traffic between one great city and another that is carried cheaper because of such a war. If any change is made elsewhere it is to raise rates so as to make up for the losses suffered here. At the innumerable small towns from which wheat, corn, hogs, cattle, and other country products are shipped to the great cities the rates are, if anything, higher, and the small dealer in produce has to deduct the increase in the cost of transportation from the price he pays to the farmer. Meanwhile the numerous small stockholders of the roads, who are perhaps poor men and who have nothing to do with making the war, find their income reduced by a fall in dividends; the bondholders, perhaps, fail to get their interest, and the consequent fall in securities works serious disturbance in financial markets. But at least through traffic is a great gainer? The gain is very questionable. Shipments of goods are no doubt stimulated for the time, but the war can not, in the nature of the case, last indefinitely, and the reduction in rates, being only temporary, will stimulate speculation rather than benefit legitimate trade. The speculators are, in fact, the only class who are certain to benefit by a railroad war. These men, by carefully observing the fluctuations in the prices of railway securities, and of wheat, flour, and other commodities, occurring as a result of the war, are often enabled at these times of disturbance to reap large gains at the expense of legitimate business.

If such are the results of the railway war, it must be looked upon as a public evil. But how can this be? How is it possible that competition, which in other branches of industry regulates prices so as generally to be fair to both producer and consumer, fails so completely to regulate the prices of transportation? We have seen why it is not possible upon a single track, and why it is

not in general practicable upon two or more tracks between the same points. Let us now see why it fails even upon the great through routes, where there is perhaps traffic enough to enable all the competing lines to be operated at a profit, provided the rates are not unreasonably low. For this purpose it will be necessary to look rather closely into the nature of competition, and try to discover where railroad competition differs from other kinds.

If a number of fishermen bring fish to a certain market to sell, it may be supposed, that as a result of competition among them, the price of fish will become such that an ordinary catch will bring enough to pay each man fairly for his work—that is, each will get as much as he could by leaving fishing and taking to some other sort of work. If the price falls below this, some of the fishermen will go into some other occupation. The supply of fish being thus reduced, the price will rise until it is as high as before. If the price rises and fishing becomes more profitable than other kinds of work, more men will go into it, until the resulting increase in the supply causes the price to fall again. This is the theoretical working of competition; and in the case of the fisherman, if there is plenty of other work at hand, and if he has no sentimental attachment to his trade, it may act as the theory supposes, and keep prices reasonably uniform and fair to all concerned. Take, now, the somewhat more complicated case of a retail tradesman, say a dealer in dry goods. The price of dry goods will be regulated by the necessity he is under of getting enough out of his business to pay the interest on the capital he has put into it, the rent of his store, the wages of his clerks, and a fair compensation for his own labor. If he can not get this, he will sell out his stock, give up his store, discharge his clerks, and go into some other business. In general, then, his selling price must be enough higher than his buying price to cover all these things, say twenty per cent higher. But it is to be well noted that this consideration does not fix the price of any particular commodity, since he may make more on some and less on others. If he is making thirty per cent on silks, he can afford to sell his cottons at a profit of ten or five, or perhaps even two. As long as he is in the business, he can better afford to sell them at even the smallest advance upon cost than not to handle them at all. If competition is very close upon calicoes, he will sell them upon the smallest possible margin of profit and make his store-rent, the interest on capital, etc., by charging high prices on silks, carpets, and woolens. In this case, therefore, competition is a very imper-

fect regulator of prices, the only thing clearly determined being that the dealer will go out of business when prices in general become so low that he can do better by taking himself and his money elsewhere. Let us now look at an industry where the conditions are different, where it is not so easy to go out of business. Suppose a number of men have put their money together and built a wagon factory. Competition will affect the prices of wagons in nearly the same way that it affected the prices of dry goods, until it comes to the point where prices are so low that the dry-goods dealer would go out of business. But it is not so simple a matter to go out of the business of wagon-making. Suppose prices become so low that the investors find that they are making only two per cent on what they put in: will they shut down their works? Probably not. They can better afford to put up with two per cent on their capital than to lose a great part of it altogether, as would be the case if they went out of business. They have a factory and a quantity of expensive machinery on their hands. These things are especially adapted to wagon-making, and, as they are probably of not much use for any other purpose, they may not be salable for half their value. It is probable that, rather than suffer this loss, the proprietors will maintain their factory and continue to lose the difference between two per cent and the return they might have got by lending their capital at interest or investing it in some other business.

It appears, then, in the case of the retail dry-goods dealer, that where there is, in addition to the actual price of goods that the merchant has to pay, a fixed expense, like store rent, to be added to the selling price, competition does not regulate prices equably among the various sorts of goods sold, but that the price of certain articles may be made to bear the fixed expense, while others are sold without regard to it. In the case of the wagon works, it is seen that when capital is invested in such a way that it can not be withdrawn without the sacrifice of a great part of it, the business may be continued when the prices for which goods must be sold are such as to yield little or no return on the investment. In both these cases, then, and in others like them, competition may cause the price of goods to fall below what they actually cost if fixed expenses and the interest on capital are reckoned as a part of cost and equally apportioned.

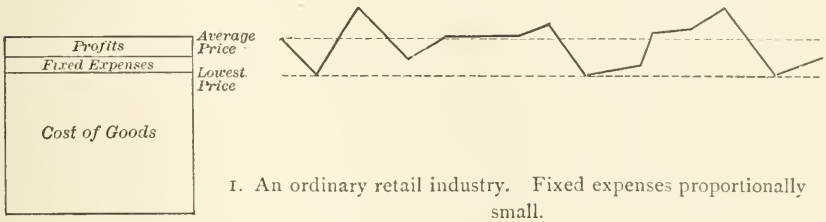
It is obvious that the greater the proportion that the fixed expenses bear to the total expenses, and the larger the share of the

capital that can not be extricated from the business, the more powerful these elements will be to disturb prices and defeat the theoretical and beneficial action of competition. In the cases named they are seen in a mild and comparatively harmless form. Rent and wages ordinarily bear but a very small proportion to the total yearly purchases of a retail dealer, and a manufacturing plant is usually salable for a substantial portion of what it cost. But what of a business where the fixed expenses are from one half to two thirds of the cost of the goods, and where the capital is so invested that but a very small part of it can be withdrawn and put to any other use? In that case it may be expected that prices will have but little relation to the cost of the goods, and that competition, its action not being limited by the power of withdrawing from business, will be feverish and perhaps destructive. A railroad is such a business, and railroad competition is likely to be such competition. The railroads of the United States spend annually, exclusive of dividends, over one billion dollars, of which some three hundred and eighty million are interest on borrowed money, taxes, and other expenditures classed as fixed charges. A much larger sum, however, belongs with fixed expenditure in the sense that it does not decrease with a decrease in business. The maintenance of the tracks, buildings, and stations, and the office expenses, go on about the same, whether much or little business is done, and scarcely any of the expenses are reduced in the same proportion as the traffic. A railroad, then, would gain nothing by refusing to take goods for transportation when rates are fallen so low that they do not cover all the expenses. The expenses remain in any case, and it is better to pay a part of them than none at all. Under competition, therefore, railroad rates may fall to almost any figure, until they are only just enough to cover that very small share of the expenses that would be avoided by refusing to take the goods. Of course, it will be attempted to make up this loss by high rates where there is no competition, and the amount charged will be just as high as the shippers will pay rather than not ship their freight.

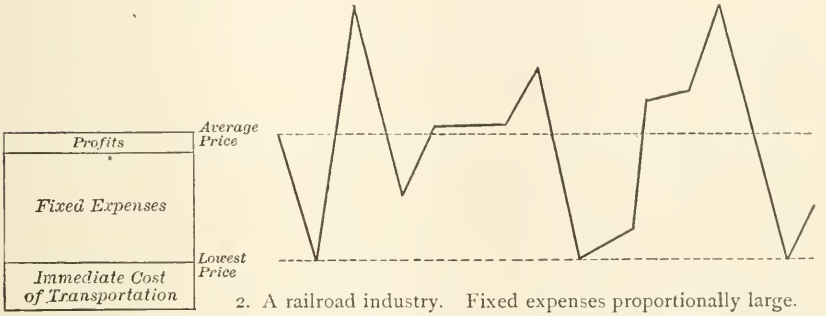
The relation of fixed expenses to fluctuations in price may be illustrated by a diagram. The first figure represents an ordinary retail industry, in which the fixed expenses (store rent, etc.) take up but a very small part of the total receipts. The large rectangle represents the total receipts, and the subdivisions show how they are expended. The irregular line to the right indicates the extent of the variations in price that may be expected to occur

under the varying pressure of competition. The lower limit of price is supposed to be fixed by the cost of the goods.

The second diagram illustrates a case exactly similar, except that the industry is one in which the fixed expenses bear a large proportion to the total receipts.



1. An ordinary retail industry. Fixed expenses proportionally small.



2. A railroad industry. Fixed expenses proportionally large.

DIAGRAMS ILLUSTRATING THE INFLUENCE OF FIXED EXPENSES ON FLUCTUATIONS IN PRICES.

The point that these figures illustrate is that, since the fixed expenses remain the same, whether much or little business is done, they do not operate directly in setting a lower limit to prices. They must be covered by the business as a whole, but do not necessarily enter into the price of any particular article. Therefore they tend to widen the range of diversity in prices. If a railroad can get freight at rates sufficient to cover the immediate cost of transportation—that is, rates falling anywhere above the lower dotted line in the second figure—it can better afford to carry it at these rates than not to carry it at all. The immediate cost of transportation—by which is meant that part of the cost that depends upon whether the particular freight in question is or is not taken—corresponds to the cost of the goods in a retail business, and may be supposed to set the lower limit to rates. The difference in the range of fluctuation shown in the two diagrams is obviously due to the larger proportion of fixed charges shown in the second.

These diagrams by no means attempt to illustrate the whole question of railway rates—this would involve many considerations not shown in the figures—but only the influence of fixed expenses in widening the range of fluctuations.

A railroad company's investment being chiefly in right of way, roadbed, tracks, and other fixtures which can not be put to any other use, it is practically impossible for it to go out of business. If the losses incurred in competitive traffic can not be made up upon that traffic of which the road has a monopoly, the dividends suffer, until finally none can be paid. If matters grow worse, the interest on the bonds—that is, on the money borrowed—fails, and the road is bankrupt. But there is no thought of discontinuing the trains. They run on as before; and the road, instead of being forced out of business, is forced to compete more recklessly than ever, until, perhaps, all its rivals are brought to the same condition.

Such is unrestrained railroad competition for through business—injurious to all other traffic, ruinous to the railway investor, and detrimental to the general business interests of the country.

The railroad wars, commencing about 1870, soon brought out these facts, and the railway managers perceived that their interests required that some means be found to put a stop to this destructive competition. Naturally the first expedient tried was the fixing of a schedule of prices for transportation, and an agreement among the railroads to carry freight at these prices and no less. But it was found difficult or impossible to secure the keeping of such agreements. Every road, while desirous that rates should be kept as high as possible, was eager to secure a large share of the business to itself by making it in some way a little cheaper for the shipper to send his freight over it than over any other. Some small reduction being made, this reduction would at once become known or suspected by a rival road, which would then make a larger reduction. Once started in this manner, there was no reason why the competition should stop short of a war. As there was no way of knowing certainly that rates were not being cut by a rival road, such cutting was often suspected when it did not really exist, and the road that began it did so in the belief that it was only meeting a cut already made. Even when there was nominally no reduction of rates, arrangements were often made with the road which answered the same purpose. He was given a rebate—that is, part of the nominal price was paid back to him—or his goods were

"underbilled"—that is, received at less than their actual weight —so that part of them went free. Numerous ways were found of avoiding the agreement without openly breaking it.

Since a mere agreement could not be kept, attention was turned to the devising of some more effective plan. It was seen that as long as the roads had a motive for reducing the rates below those agreed upon, they would always be likely to do so. Was it not possible to take away this motive? If all the business for which the various lines competed could be divided among them, either in equal parts or on some other fixed basis, there would then be nothing to be gained by cutting rates. Or the same purpose might be answered by letting each line carry as much as it pleased, but requiring that all the receipts be paid into a common treasury and divided on a fixed basis. Such arrangements were in fact carried into effect on a number of the principal competitive routes. They are called pools. The chief difficulty in forming pools was to decide just what share of the business or of the receipts was to go to each road. Of course, no road would consent to the arrangement unless the proposed division was such as to give it nearly or quite what it regarded as its fair share. But how determine what was a fair apportionment? In a general way a fair share was held to be that share which the road could get for itself under competition. This share was seldom equal among the several roads, and depended upon a variety of circumstances. One line might be preferred by shippers because it was shorter than another, and therefore could bring the freight to its destination quicker. A second might have better through arrangements, so that it could carry freight to distant points without subjecting it to the delay and risk of being moved from one car to another. A third had perhaps stations and warehouses more commodious, or nearer to the place where the goods to be shipped were stored. Or it might be that a certain road was a favorite because of the greater courtesy or more accommodating disposition of its agents. So great was the influence of these and other like considerations, that the share awarded to one road was often three or four times that awarded to another.

Although pools, where they were introduced, had a tendency to maintain rates and to prevent railroad wars, they were a far from satisfactory solution of the question how to regulate the price of transportation. They were difficult to form, and still more difficult to keep up. Speaking generally, no road was ever quite satisfied with the share of business assigned to it. There

was no absolute criterion; it was a compromise with which there was always more or less discontent, and which in many cases could not be arranged at all. When formed, it remained a mere voluntary association, to be broken up whenever any road became sufficiently discontented with it. The several lines were constantly clamoring each for an increase in its share, and threatening to break the pool if these claims were not allowed. It was, moreover, difficult to be certain that all lines that could compete for the traffic were included in the pool. New ones were constantly being formed, reaching the destination by roundabout ways and perhaps two or three times as long as those more direct, but none the less able to compete for the business and disturb the pool. On the part of the public, pools were looked on with great disfavor—a disfavor finding expression later in that clause of the interstate commerce law that forbids them. The people, perhaps not appreciating fully those peculiar features of the railroad business already discussed, looked upon them as attempts to keep up rates by an unwarrantable interference with the natural working of competition—as a sort of trusts whose end was monopoly.

Transportation being something upon which every considerable branch of industry is immediately and vitally dependent, and being also by its very nature a monopoly, it is but natural that the price of it should be a matter of much dispute. On the one hand, the managers of railroads have for the most part looked upon them merely as a business by which money might be made, and in whose management they were under no more obligation to consult the interests of other people or the general public than those engaged in any other business. On the other hand, the people have been generally inclined to believe railroad charges extortionate, and to attempt to reduce them, both by encouraging the building of competing lines and by legal enactments. It is, indeed, a matter of extreme difficulty, if not of impossibility, to determine what is a fair price for any particular kind of transportation. The price of most industrial products is commonly believed to be so regulated by competition as to be, in the long run, about equal to the cost of production, including in this cost the profits of the manufacturer. But, as we have seen, the price of transportation is not in any proper sense regulated by competition, and has very little to do with the cost of production. As far as the self-interest of the railroads is concerned, it may be anything from shameless extortion down to a sum scarcely more than enough to pay for loading and unloading the freight. Nor, sup-

posing it to be desirable to fix them by law, is it possible to formulate any arbitrary rule that would not fail in practice. Suppose that, following the analogy of other industries, the cost of production be taken as the basis of price. We may suppose that the cost of carrying a ton of freight from Chicago to New York is found, interest charges and other fixed expenses being duly apportioned, to be ten dollars. This, then, will be the rate charged for a ton of freight, no matter what that freight may be, whether it be a ton of wheat or a ton of dressed beef. But the ton of wheat is worth only $40, while the ton of dressed beef is worth $250. The charge for transportation is, then, one quarter of the whole value of the wheat, while in the case of dressed beef it is only one twenty-fifth. Suppose, now, the price of wheat is $32 at Chicago and $40 at New York, while that of dressed beef is $200 at Chicago and $250 at New York. Clearly, wheat will not be transported at all at this price, since the Chicago price with the freight charges added is more than the New York price. Dressed beef, on the other hand, could pay a charge of twenty or even thirty dollars a ton and still yield a profit when sold in New York. If the system is maintained, either the Western farmer will be unable to send his wheat East at all, or he will be enabled to do so only by selling it at a ruinously low price. At the same time, clothing, silks, woolens, and a hundred other expensive commodities will be charged only a fraction of what they could well afford to pay.

If the distance freight is carried, instead of the cost of carriage, be taken as the basis of charges, the injustice as between cheap and costly commodities will remain the same, and be open to the same fatal objections. But supposing it be admitted that there must be a difference between the charges for various commodities, that dressed beef must pay more than wheat, and silks more than coal, should not the charges for any one commodity, as wheat, be made proportional to the distance it is carried?—that is, should not twice as much be paid for carrying a ton of wheat four hundred miles as for carrying it two hundred? It is to be noted, in the first place, that the cost to the railroad is not twice as much. That cost consists largely in the cost of handling the car at the beginning and end of its journey and in loading and unloading it. This is the same for two hundred miles as for four. If this is ten dollars, and the cost of actually moving the car five dollars a hundred miles, then the cost of the two hundred miles journey will be twenty dollars, and that of the four hundred miles journey thirty,

or only half again as much. Again, is it wise to charge the farmer who lives two thousand miles from New York one hundred times as much for carrying his wheat to that city as the one who lives only twenty miles from it, as the rule would require? Either the first charge will be so high as to ruin the Western farmer; or, if a rate is made low enough to enable his wheat to be shipped, the charge for the short distance will be a mere trifle, some small fraction of a cent a bushel—too low, perhaps, to pay the cost of loading and unloading it. Moreover, the point of Western shipment may be on the Great Lakes, or some other route of water transportation, with which the railroad has to compete, so that it can not get the wheat to carry at all without making a very low rate—lower compared with the number of miles the freight is carried than it could afford to make for shorter distances.

But since there seems to be no definite rule for fixing railroad rates, how are they, in fact, determined? What are the practical considerations which cause a railroad to adopt a certain set of prices for the service it renders?

It may perhaps be thought that when the price of transportation is left to be fixed by the railroads it follows no definite principle whatever, but is now extortionate where the road has a monopoly or where the shipper is for some other reason at its mercy, now unfairly low when the road desires to favor certain persons or places at the expense of others, or when it is engaged with other roads in a senseless war of rates. There is doubtless truth in this view of the case, and rates are often determined by considerations no better than those named. There is, nevertheless, a principle more or less effectively at work which, though subject to many abuses, and often unjust in its working even when strictly applied, is, after all, better and more practicable than the plan of charging according to the cost of service or the distance carried. This principle is called charging what the traffic will bear. It rests on the sound assumption that the adequate movement of persons and goods is the chief end of transportation, and that it is expedient so to distribute the cost of transportation as to make this movement as free as possible. Therefore the rates must be low enough to move the goods—not so high, that is, as to make it unprofitable to ship them. The rates so determined will be so low in many cases as to yield little or nothing above the immediate cost of handling to be applied toward the payment of the fixed expenses of transportation. This deficit must be made up by a higher charge upon whatever part of the

traffic will endure that higher charge without being reduced in amount or unreasonably burdened. In following this rule railroads consult their own interest. It is to their advantage, as already explained, to carry as much freight as they can, at a high price if possible, but to carry it even at a low one. Accordingly, where there is much competition, either with other railroads or with a line of water transportation, rates are made very low indeed; low enough to secure some part at least of the business. As among different commodities, very low rates are made upon those—like wheat, coal, lumber, and iron ore—which, being of little value in proportion to their weight, could not be shipped except at these low rates, while those that can pay more are made to do so. This is effected by making a list of all the kinds of goods carried, and arranging them into a number of classes; three or four times as much being charged for carrying the highest class as for the lowest.

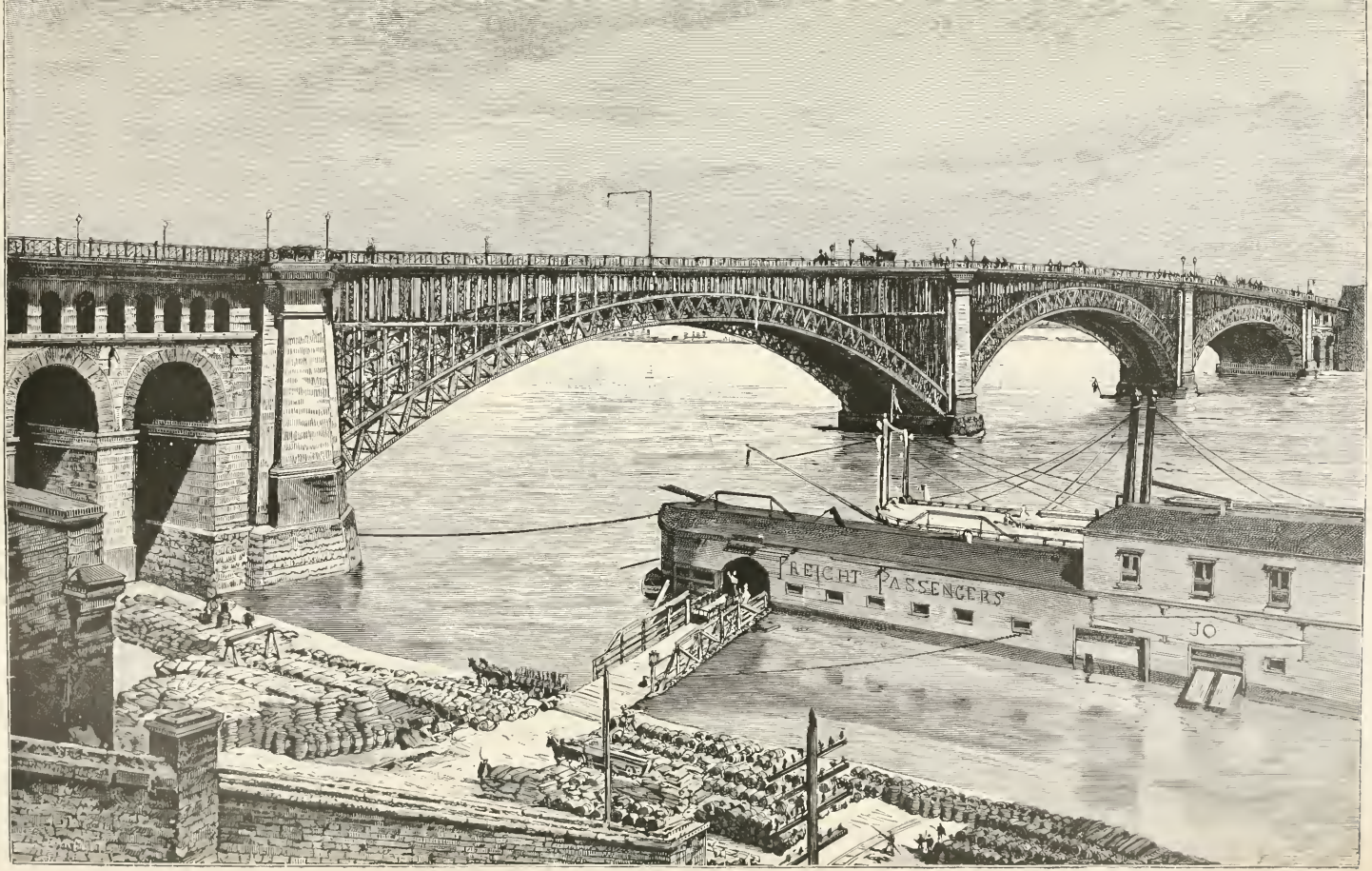
Applied by a new road to the country through which it passes and in which there is as yet but little industry, this principle may take the form of making rates to develop traffic. The establishment of manufacturing or agricultural industries is encouraged by holding out assurances that in case these industries are established the railroad will carry their products at rates low enough to enable them to be sold at a profit. It is, of course, to the interest of a railroad that the country of whose transportation it has a monopoly should be commercially prosperous, and in this interest is found the most important natural check to the extortion which its position enables it to practice. Suppose a brewery established upon one of the Western roads, at a point where there is no other means of transportation, is competing for trade farther west with breweries at Milwaukee, which city is also reached by the road in question: will the Milwaukee brewers be favored because that is a competing point? On the contrary, if the road is wisely managed it is quite probable that it will prefer to build up the brewery on its own line, of whose business it will then be sure, and which will add permanently to the prosperity of the road, even at the cost of losing some of the competitive business.

Is, then, this interest of the railroads in encouraging business along their lines a sufficient guarantee that they will not practice extortion? It is not, and the following are some of the reasons: In the first place, the line of action spoken of in connection with the breweries presupposes a patient and farsighted policy on the part of the managers of the road practicing it—a policy having

regard to what will be to the advantage of the road in five or ten years rather than to its immediate advantage. Now, many roads, probably most roads, are not managed with any such farsighted policy. The stockholders of the company, not understanding the intricacies of the railway business, look upon immediate profits as the test of success; and the officers, eager to meet this test, are likely to get all the business they can now, and let the future take care of itself. Again, the interest of the railroads in maintaining low rates decreases or disappears when the industry is so firmly fixed that it can not well move. The farmer, when once he has established himself and made him a home, is very much at the mercy of the railroad on which he lives. Removal is out of the question, except as a desperate resort. He must stay where he is; he must raise such crops as suit the soil, and he must sell them at such prices as are left after the price of transportation is taken out of the price of his products in the distant market. The price of the products must be divided between him and the railroad, and the railroad has every advantage in driving the bargain. If his produce is perishable, like fruit, he can not even delay, but must ship it immediately, paying whatever the railroad chooses to demand. It is quite generally believed by farmers, whether rightly or wrongly, that railroads practice extortion of this sort, and, as will be seen, this belief has been the basis of much legislation in the Western States.

In reply to complaints of extortion, it is commonly urged on the part of the railroads that their business is not an especially profitable one as the matter stands, and that the charges can not be reduced without making it unprofitable. The statement that railroads are not especially profitable is borne out by the facts. Statistics, though they can not answer the question precisely, indicate that the return derived from railway investments is not, on the average, more than five per cent of the actual cost of the lines. If this is true, it can not well be claimed that rates in general are too high, and if they are too high in some instances they must be too low in others. Such an unfair inequality in the adjustment of rates is known as discrimination, and characterizes the most numerous and important class of abuses in the administration of railways.

Discrimination may be of several kinds. It may be local discrimination—that is, giving the people in some one town or district an unfair preference over those of another. It may be personal—that is, giving to some persons special privileges not enjoyed by



Bridge at St. Louis.

others. Even the classification of freight, by which more is charged for carrying one kind of goods than another, may involve an unjust discrimination if it is made in such a manner as to prejudice certain kinds of business for the benefit of others.

While the farmer finds the price he gets for his wheat cut down by what he regards as extortionate rates, it is very likely that he may read in his newspaper that the same railroad which charges these rates is making extremely low ones between competitive points. He may live only fifty miles from Chicago, and yet find that it costs as much to send his wheat to that city as it does to send wheat from Minneapolis, or, before the interstate commerce law prohibited the greater charge for the shorter haul, even more. To his mind this would be a clear case of unjust discrimination. This railroad, he will say, is charging me more than it does the people at Minneapolis for five or six times as much of the same thing. As he will not readily suppose that the Minneapolis business is done at a loss, he will conclude that the road is taking advantage of his helpless situation to extort from him several times as much as he ought to pay.

The small town through which but one railroad passes is in much the same situation as the farmer. It may have every natural advantage—a rich farming country tributary to it, abundant water power, energetic and enterprising citizens; but if the policy of the railroad is unfavorable, it can have little growth, little prosperity; manufactures can not flourish, its inhabitants buy dear and sell cheap. Its neighbor, more fortunate in being a competing point, or in being for some other reason favored by the railroads, prospers by that alone; and, its supremacy once established, maintains and increases it in defiance, perhaps, of every natural consideration entering into the case. "The tendency of railroad competition has been to depress the rates down and still further down at these trade centers, while the depression at intermediate points has been rather upon business than upon rates."*

These are forms of unjust discrimination among places. Discrimination among persons is even more odious in its character, and not so capable of defense as a business necessity. In the freight traffic it takes the form of charging a higher price to one person than to another for the same kind of service. In the passenger traffic it appears in many forms, but chiefly in the giving of free passes to certain favored persons.

* Interstate Commerce Commission, First Annual Report.

Under the system of personal discriminations in the past, and in the present so far as this system still prevails, the obtaining of rates of transportation at one of the great competing points was a matter of such secrecy, intrigue, back-stairs influence, and falsehood as to recall the annals of a European court at some corrupt period. The price of transportation, instead of being equal to all, as the interest of the people imperatively requires, was largely determined by corrupt influence, personal favoritism, and other improper considerations. Those were most favored whose friendship was most desired, whose enmity was most feared, or who had the greatest genius for intrigue. It was currently believed that an aptitude for deception was among the first qualifications for a railroad freight agent. His arrangements with the shippers were made upon a basis of the strictest secrecy, and it was his business to make each one believe that he (the shipper) was peculiarly and exceptionally favored. Of course, the general result was that the rich, the powerful, and the influential were favored at the expense of the small shipper, and his business competition with them made more hopeless than ever. Secret contracts were made with certain concerns under the terms of which their freight was for years carried at lower rates than any other goods of the same kind, and their less favored rivals were driven out of competition with them. Vast monopolies were thus built up, among which the Standard Oil Company is the most conspicuous example. The contracts might be made simply with a view to securing to the railroads the business of the favored concerns, or they might be, and often were, made because the railroad officials had a corrupt interest in the matter. The freight carried at the exceptionally low rate might, for instance, be the coal from mines of which the officers of the railroad company were the principal owners. These officers were thus, by making the rate, really paying large sums of money into their own pockets at the expense of the stockholders of the railroad. These discriminations sometimes took the form of lower rates, sometimes those of drawbacks, rebates, underbilling, etc.—indirect methods of reducing rates already mentioned in speaking of competition.

It need hardly be said that these methods are contrary to the spirit of American life, and injurious to industry and to morality. Under them the rich profit at the expense of the poor, and open and honorable dealing suffers to benefit secrecy and indirection. A great public agency, indispensable to every department of industry, is made a teacher of immorality.

The giving of free passes to certain favored individuals is discrimination of a very bad sort. These passes are usually given either from personal favoritism or because the recipient is in a position to help the railroad by his friendship or injure it by his enmity. A few years ago it was customary all over the United States for members of the Legislatures and other holders of important public trusts to receive from the railroads—even to demand from them—free passes. Of course, the motive of the railroad in giving passes to such officers could be but one, namely, the expectation that the officer favored would in return either use his trust in such a way as to assist the railroad or abstain from action that would injure it. In either case the transaction was improper. If not bribery, it was blackmail. It was more often of the latter character; the giving of passes not being regarded as a favor to be requited so much as the withholding of them was regarded as an offense to be punished. They were looked upon as one of the perquisites of office.

In a still more numerous class of cases the recipients of passes are private citizens of wealth or consequence whose good will the railroad wishes to conciliate. Many are large shippers, many are simply persons of standing in the communities where they live, whose favorable or unfavorable voice may aid or injure the railroad when it seeks to secure some local privilege, or on some other of the numerous occasions when a railroad has need of influential friends.

The giving of passes in these cases is detrimental to the public interest, and the acceptance of them difficult to reconcile with strict morality and an upright and self-respecting citizenship. Transportation is something whose production costs money, and, strictly speaking, it is hardly honest to receive it for nothing, or to barter away for it a citizen's duty and privilege of independent public action. The persons who ride for nothing are precisely those who can best afford to pay for riding, while the cost which they shirk is borne by the poor and uninfluential. Millionaires have free passes for themselves, their families, their friends, and their private cars. They demand these privileges if necessary, and look upon them as appurtenances of their social position. The common laborer pays the full fare, a part of which necessarily goes to help pay for carrying the millionaire.

Transportation, then, in its latest form has proved to be an industry not sufficiently regulated by those natural forces of self-interest and competition once thought to be all-sufficient. Com-

petition has failed to protect the public, and, instead of a natural stimulus to wholesome activity and enterprise, has taken the form of a destructive warfare, ruinous to those engaged in it and detrimental to the public interest. Monopoly has been unavoidable, extortion has sometimes been practiced, and injustices and discriminations of the most pernicious sort have been almost universal. What the law can do to better this state of things is one of the most important political questions of the present day.

The corporations by which the railroads of the United States were built were created by State laws, and got their roadway through the exercise by the States of the sovereign right of eminent domain. Moreover, the earlier roads were local in their operations and but little engaged in interstate traffic. It was very natural, therefore, that the regulation of railroads by law was first undertaken by the States, and that the power of Congress to legislate in such matters, under that clause of the Constitution that gives it power to regulate commerce among the States, should have been resorted to only when the States proved unable to cope with certain aspects of the problem. Water transportation was much earlier recognized as a proper subject for Federal legislation, and the means of transportation on the Great Lakes, navigable rivers, and the coasts of the Atlantic and Pacific Oceans were made the subject of Federal laws.

A great part of the laws of the various States relating to railroads concerns not so much transportation itself as the regulation of the roadway and vehicles with a view to public safety and the rights of citizens living upon the line. Where bells shall be rung to warn people of the approaching train; what precautions shall be taken to prevent accidents at stations; when the track may cross a highway upon the same level, and when it must pass above or below it; what sort of bridges may be built; what safety car-couplers, automatic brakes, steam-heating arrangements, and other devices looking to greater safety or convenience, shall be used—these, and a hundred more similar matters, are in all States the subject of somewhat minute regulation. Congress also has recently taken important action as to these matters in the passage of a law designed to protect employees from accident by compelling railroads to adopt certain uniform devices for braking, automatic coupling, etc. Railroad legislation deals also with the organization of the companies, with the issue of capital stock and the sale of bonds, with land grants, subsidies, and other forms of public aid to railway-building, with the taxation of railroads; in

short, with all aspects of this great industry. The questions, however, which engage most public attention at present, and that are commonly spoken of as the railway problems, are those already discussed. They concern rates or the price of transportation, and the unjust discriminations and other ills connected with rate-making.

The first energetic and widespread attempt to regulate railway rates took place in certain Western States soon after 1870. There had been a period of speculative railroad-building. Railroads had been built for which there was no sufficient demand, and farmers had been induced to settle upon their line by extravagant assurances. As Prof. Hadley puts it, "railroads and settlers both moved too far West, and ran heavily in debt to do it." A time of depression and discontent followed. Neither the railroads nor the farms paid. All those abuses which have been spoken of were flagrant, and the farmers believed unjust treatment by the railroads to be the cause of their lack of prosperity. They found a means of organization at hand in their granges and proceeded to use it to procure legislation. The simplest solution of the matter seemed to be to reduce the rates by act of the Legislature. This was accomplished in a variety of ways. In some cases a schedule of maximum rates was incorporated in the law. In others it was provided that the rates between noncompetitive points should be the same in proportion to distance as those fixed by the railroads themselves between competitive points. The third plan—that which has proved the most practicable—was to delegate the power of regulation to a permanent board or commission.

The earlier legislation was so harsh and crude as to defeat its own purpose. Rates were indeed cut down, and the granger laws, as they were called, withstood successfully the attacks of the railroads upon their validity, and were finally declared constitutional by the United States Supreme Court. But the railroads ceased to pay, the service deteriorated, the construction of new lines stopped, all branches of industry suffered, and Eastern capital no longer sought the States where the obnoxious laws were in force. All suffered alike, and the more stringent laws were soon repealed, and recourse had to the more flexible system of regulation by commissions.

State railroad commissions appeared first in the New England States, where their original purpose was to see that the public safety and convenience were duly cared for in the conduct of railways. Later they became boards of arbitration for hearing vari-

ous controversies arising between railways and private citizens. So much more practicable is it for a small and permanent body of men to look after railroads than for a Legislature to do so, that attempts at supervision and regulation almost necessarily take this form. Ultimately commissions were established in all but a few of the United States. In the powers given to them by law, and in the degree of supervision or regulation they attempt to accomplish, there is, however, considerable difference among them. There are two principal types, one of which has been adopted in the New England and some other Northern States, the other in the West and South.

The theory upon which the Massachusetts commission, the chief example of the New England type, rests, is that evils in railway management may for the most part be remedied by pouring plenty of light upon them. The powers of the commission are chiefly those of investigation, advice, discussion, and report. It requires from the railroads detailed reports of their financial and other operations, which are printed for the information of the public. It may prescribe the form in which the accounts shall be kept, and may inspect them at any time when it sees fit to do so. In case of controversy it appoints a hearing, listens to both sides, examines witnesses, and renders its decision, which is usually respected, though it has in most cases no legal force. Every year it prints a report in which all matters of public interest relating to railways are vigorously discussed. If the roads have in any way been remiss in their duty, the circumstances are clearly brought out and sharply commented upon. The controversies brought to the attention of the commission are discussed and the reasons for each decision fully given. These reports tend to bring about a good understanding, and to further the amicable settlement of all controversies.

While this mild kind of regulation has worked pretty satisfactorily in the older States of the Northeast, where industrial conditions are comparatively settled, where the railroad officers, the shippers of freight, the stockholders, and the passengers are fellow-citizens and public opinion intelligent and powerful, it has not met the needs of the West and South, whose development is newer, and whose railroads are often controlled by officers living in Eastern cities half a continent away. The Western and Southern railroad commissions, while possessing all the powers of those of the East, add to them, in most cases, the power to fix and alter the rates for the carriage of passengers or freight.

Obviously the working of a system of regulation that intrusts this delicate and important charge to a commission depends almost wholly on the intelligence, energy, and fairness of the men of whom the commission is composed. It is probable that the earlier Western commissions, urged on by the people, were often unjust to the railroads in their rulings. But such injustice, if it existed, has greatly decreased, and is being replaced by a better understanding between the roads and the representatives of the people. The work of a railroad commission is an education at once to the roads, the public, and the commissioners themselves. The first learns something of the peculiar exigencies of the railroad business—that the higher rate for the shorter haul, for example, is not always deliberate and malicious extortion, but may be required by urgent and legitimate business considerations. The railroads are taught not only that their business owes a responsibility proportioned to the peculiar privileges that they enjoy, but also that the people know their rights and have the will and the power to enforce them. The commissioners, having frequently to hear both sides of the question presented by their ablest advocates, and having to become practically acquainted with many of the details of railway working, are in a position to qualify themselves to be just arbiters of all controversies, and to interpret each side to the other.

Besides these powers delegated to commissions, nearly all the States carried upon their statute books a law prohibiting unjust discriminations, and many had adopted a "short haul" law—that is, one prohibiting a greater charge for the shorter than for the longer haul over the same road in the same direction. It remains to see where and why all these forms of regulation proved insufficient.

The earlier efforts of the roads to resist the granger legislation were directed against the constitutionality of all laws fixing the price of transportation or delegating to commissions the power to fix it. When these efforts failed and the laws in question were upheld by the United States courts, the legal representatives of the railroads took a new course. It was remembered that the Constitution conferred upon Congress the power "to regulate commerce with foreign nations, among the several States, and with the Indian tribes." Now, so great had become the extent of through traffic as compared with local traffic, that only a comparatively small part of the freight movements began and ended in the same State. Were not, then, all the remaining movements

commerce among the several States, and did not the clause quoted reserve the regulation of them exclusively to Congress? If so, the State laws, in so far as they attempted to deal with such traffic, were null and void. In 1886 this question was passed upon by the Supreme Court of the United States, which decided that "a statute of a State, which attempts to regulate the fares and charges by railroad companies within its limits, for a transportation which constitutes a part of commerce among the States," is invalid. This decision rendered ineffectual a great part of existing railroad legislation, set the roads free, and destroyed all hope of the efficient regulation of rates by State laws. As applied to interstate traffic such regulation is not only unconstitutional, but, on other accounts, wholly impracticable. The railroads of the United States in their organization, their business, their aims, interests, and responsibilities, are of the Nation rather than of the State, and their regulation must therefore be in great part national. From a commercial point of view the true railroad unit is not the corporation, though its operations may extend over several States, but the system, reaching out over half a dozen States and operating to common aims the lines of many corporations. By through rates, fast-freight lines, express companies, and interchange of cars even this unity is extended until it embraces for many purposes the whole country. The regulation of such interests by State laws would necessarily involve conflict, confusion, and practical inefficiency.

The declaration of the unconstitutionality of the State laws attempting to regulate interstate traffic gave irresistible force to the agitation already going on for the exercise by Congress of its constitutional powers in the matter. The measure by which Congress proceeded to the exercise of these powers was, as is necessarily the case where new and important questions of great complexity have to be dealt with, the outcome of much investigation, discussion, controversy, and compromise. Several bills were passed by the House and rejected by the Senate, and the substitutes proposed by the Senate were in turn rejected by the House. In 1885 a committee of five Senators, with Senator Cullom, of Illinois, as chairman, held sessions in various parts of the country, taking testimony from the State Railroad Commissioners, from economists and publicists who had made a study of railway problems, and from practical men in every department of railroading, endeavoring in the most thorough and painstaking manner to prepare themselves for dealing intelligently and efficiently with the matter

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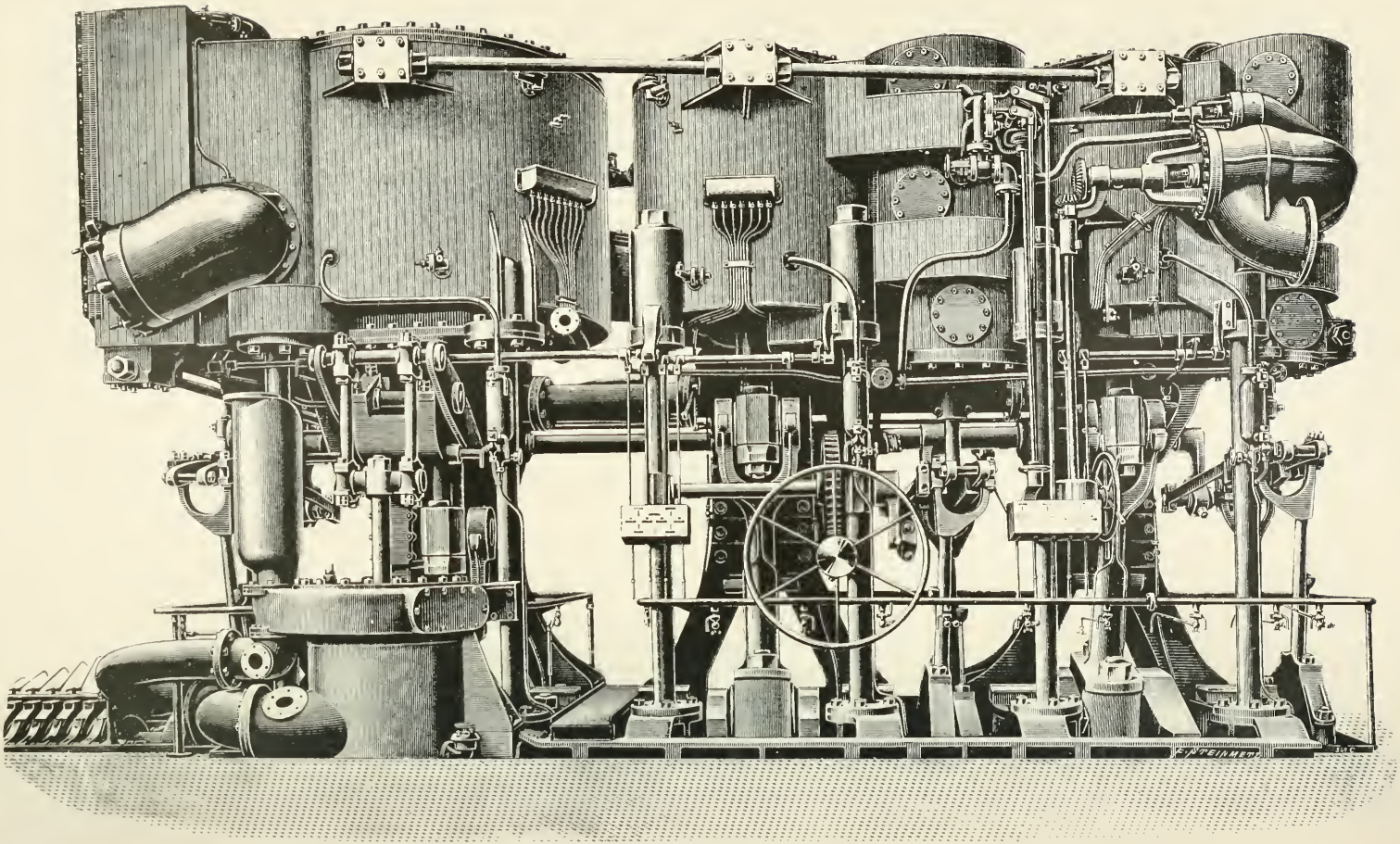


Triple-expansion marine engine.

before them. The volume of testimony published by this committee is a most important document—a compendium of all previous experience in the conduct and regulation of railways.

The "Act to Regulate Commerce," commonly called the interstate commerce law, passed both Houses of Congress in January, 1887, and was approved by the President February 4th. This act was based in great part on the experience of the States, and embraced in a more or less altered form many of those provisions of the State laws that were believed to be applicable to interstate commerce. As to all regulations not clearly interstate in character the law was silent, the purpose being that Congress should assume the regulation only of those matters with which State authority was incompetent to deal. The law, in fact, dealt chiefly with rates and with the discriminations and other wrongs connected with rate-making.

Extortion was dealt with by a clause forbidding all unjust and unreasonable charges. The act did not attempt to determine what was a reasonable and just charge. This determination was left to the commission created by the act, and, so far as the question could be judicial, to the United States courts.

All unjust personal discriminations were forbidden, and such unjust discrimination was defined to be the direct or indirect charging, demanding, collecting, or receiving, for any service rendered, a greater or less compensation from any one or more persons than from any other for a like and contemporaneous service. The penalties for the violation or evasion of this clause were especially severe, and might include the imprisonment of the offender for two years. By an amendment to the law afterward adopted the participation by shippers in unjust discriminations was also made criminal, and subject to the same penalties. This clause was of course aimed at free passes as well as at other forms of personal discrimination.

Local discriminations, or the giving of undue preferences or advantages to one locality over others, were forbidden. This clause, again, was so broad as to leave to the commission and the courts the widest margin of interpretation.

One particular form of discrimination among places was, however, definitely forbidden by a clause prohibiting a greater charge for a shorter than for a longer haul over the same line, in the same direction, and under similar circumstances. Yet to the commission was reserved the power to suspend the action even of this provision in such cases as it deemed wise to do so.

Discrimination among connecting lines, or the refusal to afford to all equal facilities for the interchange of traffic, was also forbidden.

The pooling of freight or earnings was prohibited. This clause was the subject of much controversy before the passage of the act, and, at the present time, there is no question in railway regulation more urgent than that of its repeal or alteration.

Those provisions whose aim was to secure publicity in railway matters were among the most important of the act and were directed at all abuses alike. They rested upon the belief that secrecy was at the root of many, if not most, of the evils in railway management and the indispensable condition of their continuance. The interests of the stockholders, the shippers, and the general public alike required publicity—publicity in the rates for the carriage of passengers and freight, in the issue of stocks and bonds, in receipts, expenditures, profits, dividends, and all important matters whatsoever. This publicity was provided for, first, by requiring the railroads to print their tariffs of passenger and freight charges and post them in every station for public inspection; and, second, by requiring that they should submit to the commission annual reports prepared in such form as the commission might direct, and exhibiting in minute detail all important facts connected with their business.

Such were the chief provisions of the law. To the commission which it created were intrusted such powers of summoning witnesses, hearing and deciding controversies, or conducting investigations on its own motion, as Congress deemed necessary to their enforcement. The work of the commission is laid before the public, first, in a general report to Congress published annually; second, in a report to the commission by their statistician, also published annually, and composed chiefly of presentations in tabular form of the facts reported to the commission by the railroad companies; and, third, in the printed decisions, orders, circular letters, etc., of the commission, which appear from time to time as there is occasion for them. The proceedings of the commission are also published by private enterprise in a form similar to that commonly used for legal reports.

The Interstate Commerce Commission found itself confronted by an intricate mass of problems at once momentous and complex, for whose treatment almost no guidance was to be found in precedent, and little definite instruction in the law to which it owed its existence. The enormous difficulties of the matter were well

understood by every one familiar with railroad concerns and by thoughtful people in every department of life. It was predicted in many quarters, loudly and confidently by some of those connected with the railroad interest, that the commission would break down at once and hopelessly before the flood of importunate problems that would pour in upon it. Seen against these dark predictions the early career of the commission appeared a decided success. It was only when much had been achieved, many wrongs righted, much light let into dark places, many bad things ameliorated—when, much having been accomplished, everything was expected—that it began to be evident that the efforts of the commission to enforce the law were opposed in certain important directions by almost insuperable obstacles.

The most numerous and troublesome questions with which the commission had to deal were those concerning discrimination of one sort or another in the making of rates. Although it has had occasion in a few instances to decide that rates were in themselves unreasonably high, the unreasonableness in the great majority of cases has been relative, having regard, that is, to rates made to other persons, other localities, or upon other kinds of goods, and therefore partaking of the nature of discrimination.

The long and short haul provision of the act is one of those aimed at discrimination, and its interpretation was one of the first matters to occupy the attention of the commission. Applications to be relieved from its operation—that is, to be allowed to charge more for the shorter haul—came to the commission from nearly every quarter of the country. Preparatory to investigating each case in detail, the commission, in the exercise of the discretion which the law left to it, suspended temporarily the action of the rule in a great number of cases where suspension seemed at first sight not to be clearly unreasonable. This temporary relief was, however, followed after due investigation by a somewhat strict enforcement of the rule. In the great majority of cases rates were changed in so far as necessary to conform to it, and the commissioners have been able to report each year a decrease in this sort of discriminations. The chief reason allowed to be sufficient ground for an exception to the rule is the existence of competition with transportation by water, or with Canadian railroads beyond control of the law.

The question of local discriminations in general is closely related to that of the long and short haul. Under the old system, the larger towns and the manufacturers and tradesmen in them

were able to secure from the railroads such privileges in the way of special rates as were alone sufficient to kill the competition of the lesser places and stunt their development. In the enforcement of the law the commission has taken the view that the forces which naturally and inevitably tend to the aggrandization of large towns are quite sufficient without the artificial stimulus of exceptionally low rates of transportation. If anything is favored, it should be the diffusion of population and of industrial life rather than their concentration.

Discriminations and kindred abuses in the passenger service have occupied a large part of the commission's attention. In 1889 it commenced an investigation to discover what effect the law had had upon the giving of free passes. It appeared that, while this form of discrimination was still prevalent, it had greatly decreased. In interstate traffic especially, considerable effort had been made to observe the law. On the other hand, the giving of passes for transportation entirely within one State had been but little affected, it being supposed that the law did not cover such passes. The action so far taken by the commission is but preliminary in its character, and will doubtless be followed by more positive and energetic measures.

The payment of commissions by one railroad to the agents of another for selling its tickets, and ticket brokerage or scalping, are matters of which the general public understood almost nothing until they were investigated and made public by the Interstate Commission. In their practical workings they were found to involve rate-cutting, unnecessary and improper charges upon passenger traffic as a whole, and discriminations against the ordinary, unsophisticated buyer of tickets. In its attacks upon these abuses the commission has been acting not more in the interest of the public than in that of the railroads, to which the abuses are directly injurious. Party rates—that is, the carrying at reduced prices of persons traveling in a party—and excursion tickets have also been used as a means of evading the law, and the commission has been at much pains in the attempt to devise and enforce such regulations as reconcile the legitimate use of tickets of this sort with a conformity to the spirit of the law.

But the most annoying and persistent of the abuses with which the commission has been engaged are the rate-cutting, rate wars, and personal discriminations connected with the freight traffic. Rate wars, though not defined or forbidden by the law, are so intimately bound up with unjust discriminations and the secret and

illegal cutting of rates as to form a part of the same problem. Where there is a rate war there are always discrimination and illegal rate-cutting, while such discrimination and cutting are usually the immediate causes of the war.

The provisions of the law against secret rates and the unjust discriminations which they always involve are explicit and severe. The penalties to which both parties to the transaction are liable are a fine of five thousand dollars and imprisonment for two years. Nothing is wanting, then, but the means of bringing the offenders to justice, and the principal element in this is an accuser armed with adequate proof of their guilt. The parties immediately concerned in illegal rate-cutting, and likely to be more or less informed regarding it, are four: namely, the railroad giving the secret and illegal rate, the shipper accepting it, other railroads, rivals of the first and competitors with it for the shipper's business, and other shippers engaged in the same business as the first shipper. The first two know of the transaction because they are engaged in it; the last two have various means of knowing or suspecting it. The rival railroad sees business diverted from its own line to that of its competitor, and knows that this diversion can be due only to a cutting of the rate; or the shipper himself, with a view to getting a still lower rate, may hint that he has secured some favors, though he is probably under a promise of secrecy. The business rivals of the favored shipper discover that he is buying and selling at prices which, in the actual state of the market, allowing for transportation at the public and legal rate, would be unprofitable, and which are capable of explanation only on the supposition that he is not paying as much for transportation as others are.

Among these four parties must be found the accuser with his proof of guilt—unless, indeed, some public agency armed with an adequate force of detectives shall take that office upon itself.

The two guilty parties, of course, will not reveal the transaction. As for the two others, who appear at first sight to have an interest in revealing and punishing it, it is to be noticed, first, that the knowledge they have is seldom such as would be worth anything in a court of law. The circumstantial evidence may be of the strongest, and to them and to any intelligent observer convincing, but it is no ground on which to base a criminal prosecution. Again, it appears that the rival railroads and shippers do not, in most cases, care to appear publicly as prosecutors of these offenses, however much they may be injured by them. The ship-

pers are afraid of incurring the enmity of the railroads and of destroying all prospect of ever getting any favors for themselves. The railroads have a similar fear of offending the shippers. A Chicago railroad manager says, in a letter to the commission: *

"The transportation of this country is handled by a comparatively small number of persons, who are all interested in getting the lowest rates possible and the greatest advantage over their competitors. These shippers we must depend upon for business, and if any railroad company or any railroad officials should go into court or before the commission with charges that such shippers are receiving favors from other railroad companies, it would result in that railroad company or the company represented by such officials being boycotted by the majority of the shippers."

In short, the parties immediately injured by rate-cutting and unjust discrimination in the price of transportation are for the most part unable or afraid to protect their rights and punish the offenders by a resort to criminal prosecutions. Such prosecutions have, in fact, been very few indeed, although it is notorious that there is more or less evasion of the law at all the great centers of railroad competition, and that in times of excitement and of rate wars these evasions amount to something approaching a general disregard of it.

A great decrease in these abuses has indeed taken place under the operation of the law. Much of this improvement is due to the education of popular and railroad opinion by the reports and proceedings of the commission, by the discussion of these questions in the newspapers, and by other forms of the railroad agitation; much is due to that provision of the law requiring the publication of tariffs, much to the moral effect of those provisions which declare secret rate-making criminal, and punishable by fine and imprisonment. It must be admitted, however, not only that the law against unjust personal discriminations is not thoroughly enforced, but that it is not clear that it can be thoroughly enforced without some great increase in the powers and resources of the Interstate Commission, or some radical change in the organization of railways.

Experience has shown that the aims of the act to regulate commerce were in the main wise and just, and its working has in general been beneficial not only to the interests of the public but to those of the railroads themselves. Certain defects in the law, more

* See report for 1890, page 8.

or less serious, have revealed themselves, some of which may perhaps be remedied by future amendments to it. It was found, for example, early in the history of the enforcement of the law, that there were certain sorts of transportation which, though not regulated by the act, were in so far of the same character as the transportation that was so regulated as to make their exemption unfair and a cause of disturbance. Such are transportation by water ways and by express companies. The commission has recommended in its annual reports that the law be so amended as to cover both these kinds of transportation. Again, the provisions of the act for the enforcement in the courts of the rulings of the commission have been found to be in many respects inadequate, and certain amendments have been recommended with the view of giving these rulings speedier and more certain effect. Still more serious have been the difficulties arising out of the exemption from the action of the law of what is commonly called State traffic in distinction from interstate traffic.

The supposition that there are two distinct kinds of transportation, one of which crosses State lines and the other does not, is wholly unfounded. Such a supposition overlooks the closeness and intricacy of the bonds connecting every part of the transportation business with every other part. Purely State traffic can exist only on a road which lies entirely within the limits of a single State, and no part of whose freight or passengers has its starting place or its destination without it. Probably no railroad in the country fulfills these conditions. It matters little that a certain corporation operates entirely within a single State, so long as its line makes part of an interstate passenger journey or freight haul. Its discriminations among persons, among localities, or among the various lines with which it connects have precisely the same effect as if it crossed State lines, and if held to be exempt from interstate regulation it is often capable of defeating the objects of such regulation. Nor, supposing a road to lie in two or more States, can that part of its traffic which lies entirely within a single State be properly or justly subjected to a different system of regulation from that applied to that part which crosses the line. There are many ways of using so-called State business as a means to cover discriminations in interstate business—as when a shipper is given a free pass within a State as an inducement to make his interstate shipments by the road giving the pass.

This is a fundamental difficulty, and experience alone will determine whether it will not be necessary so to extend the scope of

Federal regulation as to make it cover a great part of that transportation now supposed to be exempt from it.

As to one phase of this matter—namely, the refusal of State roads to make reasonable arrangements with other roads for through traffic—the commission has recommended an amendment to the law making the entering into such arrangements compulsory, and giving to the commission power to prescribe the terms in case of a disagreement among the roads concerned. It has also joined actively with the railroad commissioners of the various States in efforts to bring the legislation of the States into uniformity, as regards those matters in which it seems most important, with the Federal legislation. For several years past an annual convention of railroad commissioners has been held at Washington, where many matters have been discussed, especially those in which State and national legislation come in contact, and great advance made toward a good understanding among all those engaged in the public regulation of railways.

It is not very difficult to see that the interests of all concerned would be served by a much greater harmony and unity of purpose among the railroads of the country than exists at present. The peculiar character of the transportation business requires some such unity, and the lack of it is at the bottom of many of the most troublesome railway problems. In what concerns the material means of transportation, the need has in great degree been recognized and supplied. Throughout the country tracks are of the same width, and the same cars may run upon them. By virtue of arrangements for interchange, cars often do run from one end of the country to the other. Fast-freight lines and sleeping-car companies running their cars over many roads, uniform car couplings, uniform braking and heating systems, standard dimensions for wheels, axles, etc., are instances of the tendency to extend unity in construction and operation beyond the limits of any one railroad. Yet even in these matters the unity is incomplete, not sufficient, indeed, for the most perfect development of transportation. Much inconvenience is still suffered from the need for loading freight from one car into another caused by imperfect through-car arrangements; while the lack of uniformity in freight-car couplers causes annually the killing and maiming of thousands of railway employees.

In the business features, also, of railway transportation unity is required; not a harsh and mechanical unity, such as would be secured by bringing them all under a single ownership and by

the adoption of uniform mileage or tonnage rates, but a unity consistent with much diversity—such a unity as would favor the freest possible flow of commerce, insure co-operation wherever the interests of transportation require it, and diminish the motives to discriminations and destructive competition. The railroads of the United States are frequently spoken of as a system, as if they were for practical purposes a unit; but this expression has reference to a theoretical state of things rather than to the actual one. Many of the railroads now existing were built not so much to supply a public need of more transportation as with the direct purpose of antagonizing roads already in existence. Some of these superfluous roads were subsidized and otherwise encouraged by the people under a mistaken belief in the advantages of railroad competition; some were built simply with a view of forcing the older roads to buy them up. In either case such roads, if not united with the older ones by consolidation, as is often the case, must maintain their position by that mischievous kind of competition which so frequently results in railroad wars, unjust discriminations, and other evils. Notwithstanding the advances in consolidation, the management of the railroads of this country presents to-day a diversity, a working at cross purposes, a tendency to feverish and unhealthy competition inconsistent with the proper performance of the work of transportation, rendering railroad regulation extremely difficult, and hurtful in many ways to the country as a whole.

How the unity that seems desirable is to be attained is by no means clear. The sentiment of the country is distrustful toward railway combinations, as it is toward every form of the concentration of industrial power. Voluntary pooling has been prohibited by the Federal law, and any still wider extension of the principle of combination, anything looking toward the formation of a legalized railway trust, would be certain to meet with widespread opposition. On the part of the railways it is quite common to lay the blame for the present condition of things upon this distrust of combination, and especially upon the prohibition of pooling. But the pool was at best a lame device, difficult to form, more difficult to maintain, and it is not apparent that matters would be greatly bettered for the railroads by its revival in its old form. The managers of the railroads are, indeed, in no position to complain of others. They and a certain class among their customers are largely responsible for what is bad in railway matters. Those provisions of the law which are especially calculated

to benefit the railroads have been repeatedly and recklessly violated, and voluntary agreements among railroad managers having the same end in view have seldom been kept.

Some form of railroad regulation which should include the determination of controversies by representatives of the roads acting under the supervision of public authority would seem to be the most natural solution of these problems, and the one most in harmony with our institutions. Apparently one feature of such regulation must be the revival of the pooling principle, accompanied by such modifications and restraints as to render it more effectual than formerly and at the same time prevent its operating injuriously to the public interest. Whether anything of this sort will prove practicable, and, if so, just what form it will take, can not now be predicted.

There is at present an active movement looking toward Government ownership of those industries which partake largely of a public character. The railway industry is one of these, and the purchase and operation by the United States of all the lines in the country is frequently advocated. Such a purchase and operation would involve a vast extension of our administrative system, and many momentous changes impossible to foresee. There is no sufficient reason for believing that any large proportion of the people of the country is in favor of entering hastily upon so hazardous an experiment, and it is likely that for some time to come, if not always, the question will remain a theoretical one rather than one of immediate practical urgency.

Express Transportation.

The express business, as we know it, is something peculiar to the United States. It is the result of a differentiation in the transportation organism such as to assign to a separate agency the carrying of a certain class of merchandise. This class comprises the greater number of small packages too large to be taken in the mail, packages of money and other articles of great value, and such other merchandise as requires a transportation more rapid or secure than is afforded by the freight service. There is so much that is peculiar in this kind of business that it has been found advantageous to leave the conduct of it to separate companies, quite distinct in most cases from the company operating the railroad. The express companies have arrangements under which their merchandise is carried by the passenger trains, and the larger ones operate over many railroads. They offer trans-

Compound locomotive.

portation, more expensive, indeed, than that of the freight department, but much swifter and perfectly secure. They undertake the collection and delivery of packages, as well as their carriage by rail, and operate upon routes of stage and steamboat transportation as well as upon railroads. They make themselves useful to the business community in other ways more or less directly connected with transportation. They take goods "collect on delivery"—that is, to be delivered only when paid for—undertake the collection of notes and drafts in places where there is no bank, etc.

As already mentioned, it has been found that the express traffic is subject in a measure to abuses similar to those that prevail in other branches of railroad transportation, and the Interstate Commerce Commission has recommended that the companies engaged in it be made subject to the same regulation.

The Brakeman's Peril.

In speaking of travel by rail, it was shown that the danger to passengers, when the enormous amount of travel was taken into account, was surprisingly small. On the other hand, the danger to the brakemen, conductors, and other men engaged in running trains is surprisingly great, and appears the greater the more it is looked into. The latest statistics show that in all over forty thousand people are either killed or injured every year upon the railroads of this country. Of these, about seven thousand are killed and thirty-three thousand injured. The following statement shows the exact numbers, and how they are divided among employees, passengers, and other persons:

	Killed.	Injured.
Employees	2,660	26,140
Passengers	293	2,972
Other persons	4,076	4,769
Total	7,029	33,881

Most of the "other persons" of whom so many were killed were persons who were walking, standing, or lying on the track or elsewhere where they had no business to be. Such accidents are due chiefly to the carelessness of the persons injured, and to the American habit of using railroad tracks as a footpath and lounging place.

Nearly twenty-five thousand railway employees, then, are

killed or injured every year. Of course, these accidents fall chiefly upon the comparatively small class of men whose work requires them to be about the moving trains. Such men run about one chance in ten of being killed or injured each year that they work. They are annually decimated, in the strict sense of that word. In 1889 the Interstate Commerce Commission made some investigations based upon the records of the Brotherhood of Railway Brakemen, an organization that insured its members against death or total disability. It appeared that about one in sixty of the members of the order, all of whom were presumably young and vigorous men, were killed or totally and permanently disabled every year. Of all the members who died, only about one fifth died a natural death. It is well known that the leading life-insurance companies will not accept as risks men engaged in this sort of work, however vigorous their physical condition may be. Their occupation is probably the most perilous followed by any large number of our countrymen in time of peace, unless we except that of the fishermen of Gloucester.

There is much reason to believe that a great part of this killing and maiming might be prevented. The general adoption throughout the country of some uniform automatic coupling arrangement would save hundreds of lives and thousands of arms and legs. The general use of automatic brakes on freight trains would do as much or more.

In the use of the coupling device now common, the brakeman, as everybody knows, has to step in front of the moving car and guide a link into a pocket. The danger of this is obvious enough, but it is greatly increased by a circumstance not so well understood. This is, the great variety of the couplers in use, and the embarrassment and danger to the man who has to make a coupling between two different kinds. There are plain link and pin couplers and several kinds of automatic links and pins. There are automatic couplers which do not use a link. Some of these are attached to the car at a certain height from the ground, others are several inches higher or lower. The buffers, or iron blocks which take the shock when two cars come together, are put on sometimes in one position, sometimes in another. It may happen that they are so differently placed on two cars that they do not strike each other at all, in which case there is imminent danger that the brakeman will be crushed. On all important lines the trains are made up of cars from every part of the country. The men, therefore, are continually called upon to make a coupling in some manner

between cars differently fitted, and a very large part of the accidents occur in trying to make such couplings. Indeed, when train hands are called on for their testimony in the matter, they almost invariably declare that the thing most necessary is uniformity, and that the particular device to be chosen is a secondary matter.

This uniformity, for reasons not far to seek, is very difficult to attain. A road which is using a particular kind of coupler can not change to another kind without great expense; and, indeed, as long as no one kind is generally agreed upon, there is nothing to be gained by changing.

The Master Car-Builders' Association, a body including the heads of the mechanical departments of the leading railroads of the country, long made this problem the subject of discussion and experiment. Finally, in 1887, by a majority of considerably over two thirds of the interests represented, this association fixed upon a standard automatic coupling device. No one coupler was chosen, but a type of couplers under which there may be and are an indefinite variety of patent devices, differing in some respects, yet each capable of coupling automatically with every other. This result, though not agreeable to some roads, is generally and with good reason looked upon by railroad commissions and the public as an authoritative expression of the wishes of the railroad interests of the country.

Freight trains are still for the most part controlled by brakemen who walk along the tops of the moving trains, screwing up or loosing the brakes by means of wheels projecting above the cars. In the night, and in the winter, when the mercury may be below zero and the tops of the cars covered with ice, this work is extremely perilous. More fatal accidents to trainmen occur through falling from the cars or being knocked off from them by bridges and other overhead obstructions, than from any other one cause. The use of air brakes enables the train to be controlled from the engine, and does away, for the most part, with the necessity of going on top of the moving cars. They also increase safety by acting more quickly and effectively than the hand brakes. A freight train equipped with air brakes can, in case of danger, be stopped within a distance less than its own length. Without them it will usually run on for half a mile or more before it can be brought to rest.

The question of air brakes is not so complicated as that of couplers, nearly all of those in use being of a single kind. The

difficulty is to make their use general. It is of no use to have one or two cars in a train fitted with them. Since the compressed air must pass from the engine to the brake apparatus, the apparatus on any particular car can not be brought into use unless all the cars between that car and the engine are also fitted with it. Therefore, since the greater number of trains is made up of a mixture of cars from all parts of the country, there is no great motive for any one road to equip its cars with air brakes unless their use can be made general.

These are matters calling for uniform action upon all the railroads of the country, and if they are to be effectively dealt with by law it must be by a law of the United States. Nor can the law be confined in its action to roads that cross State lines. It must recognize that, in this matter at least, every railroad must be regarded as engaged in interstate commerce. For a number of years past there has been a growing agitation toward congressional action. Several of the State Railroad Commissions have recommended such action, the Massachusetts Commission being especially active in the matter. In their meeting of 1889 and 1890 the National Convention of Railroad Commissioners discussed it, and passed resolutions favoring national legislation. In the latter year they recommended that Congress and each of the States should require, either directly by law or through the instrumentality of the railroad commissions, that all freight cars hereafter built or purchased be fitted with continuous brakes and automatic couplers of the Master Car-Builders' type.

In March, 1893, this agitation attained its immediate object in the passage of a Federal law which aims to force upon the railroads the gradual adoption of uniform safety appliances, by making it unlawful to use cars lacking such appliances after January 1, 1898. This date was fixed upon because it was believed to be impracticable to complete the required changes within a shorter period. Whether this law will accomplish all that the situation requires can not certainly be foretold.

Local Transportation—Country Roads.

Besides the movement of things and persons from one part of the country to another, there is a kind of transportation which may be called local or central, and consists of the movement between industrial centers and the regions immediately about them. Before commodities can be sent to distant points by rail or boat they must be collected at the place of shipment; and when they

reach their destination they must be distributed again to the people who need them. The farmers from miles around bring their wheat in wagons to the village whence it is to be shipped East. Manufacturers from all parts of the city cart their products to the docks and freight stations; while the wholesale and retail dealers, those who distribute these products to the people, cart them from the stations to their stores, whence they are still further distributed by delivery wagons. The populations of great cities, and of hundreds of square miles of tributary territory about them, surge centerward to their work in the morning and surge out again to their homes at evening. Street railways, whether on the surface, overhead, or underground, are the chief agents in this movement of persons, although the suburban trains of steam railways have an important part in it, and even bicycles are not to be disregarded. These are important means of transportation; so are country roads and farmers' wagons, city pavements and the carts that roll over them.

Mr. Edward Atkinson has shown that the largest item in the cost of a loaf of bread is not, as might be supposed, the cost of the wheat it contains, or even the cost of the wheat when ground into flour, but the sums charged by bakers and grocerymen for distributing the bread to the people. How much of this charge is to be reckoned as the cost of transportation in delivery wagons and how much as profits, wages, etc., can not be determined, but it is likely that, in the case of bread, the delivery to the people in New York or Boston costs more than the transportation of the wheat and flour by rail from the West.

The traveler abroad can not but notice the excellence of the country roads, and mark the contrast between them and those in most parts of our own land. Our people, engrossed in other matters, have, until recently, shown little tendency to take up the problem of rural transportation in a systematic and thoughtful manner. At present the expense of hauling wheat is so great in our Western States that it rarely pays to raise it more than twenty miles from a railroad. A longer haul costs more than the profit on the culture. The value of land and the prosperity of the farmers decrease rapidly as we go back from the railroad, and a point is soon reached where it does not pay to farm at all. This condition of things has heretofore been obscured by the abundance of good farming land close to the railroads that was open to settlement, but it must become more and more significant as the country fills up. The substitution of macadamized or other

good roads for the soft earth roads that now prevail would increase the hauling capacity of horses about four times, open up to profitable agriculture a vast acreage now unavailable, and save the farmers an incalculable sum. A recent writer estimates this saving at over fifteen million dollars a year in the State of Illinois alone. The saving would be not only direct in decreasing the cost of transportation, but indirect, in enabling the farmer to choose the time of bringing his produce to market. At present the roads are impassable for heavy loads during a considerable part of the year. The farmers have to wait for good weather, and when it comes they frequently arrive in town in great numbers, and with a supply of produce so large that it can be disposed of, if at all, only at an extremely low price. Good country roads would have also an important and salutary influence in making residence in the country attractive and thus relieving the crowding of cities. In England and on the continent of Europe the tendency of the well-to-do classes to take up their residence in the country is much greater than in the United States, and with this tendency the existence of good country roads has doubtless much to do. One of the greatest—if not the greatest—objections to country residence in America is the difficulty and discomfort of getting about, and the liability to be almost shut off at times from communication with the world without.

The expense of building stone or gravel roads is of course considerable, and in districts where suitable material is not at hand they are commonly supposed to be out of the question. There is reason to think, however, that careful calculations, not from the point of view of particular townships, but from that of the interests of the farming population as a whole, would show that, even where the material had to be brought from a distance by boat or rail, the construction of permanent stone roads would be one of the most profitable investments of their money that the people could make. The fact that so poor a country as Italy has found it worth while to construct expensive macadamized roads far up into remote and thinly populated valleys of the Apennines suggests that, as regards this matter, our own fertile land is following a wasteful and short-sighted policy.

To secure a good system of country roads in the United States two things are chiefly necessary: a considerable expenditure of money, and a better system of administration. Prof. Jenks, in his monograph on country roads, has pointed out that the two principal defects in administration are the lack of a proper classification

of roads, and the failure to secure scientific road-makers to superintend their laying out and construction. Some roads are of merely local value—serve the people of a single township or part of a township; others are important highways, over which the people of large districts carry their products to industrial centers. No comprehensive and far-sighted policy can be expected until roads are classified, and those of general importance maintained at the general expense and in a condition suitable to the amount of traffic that passes over them. At present the whole matter is usually left to the township, which has no motive for spending more upon that part of the highway that happens to lie within its borders than it spends upon its local roads. As to the scientific study of roadmaking and the employment of trained experts, the thing is almost unknown.

During the past few years this question has been a good deal discussed in the Legislatures as well as in the newspapers and magazines, and it would seem that the people are awaking to its importance.

Street Railways and the Cities.

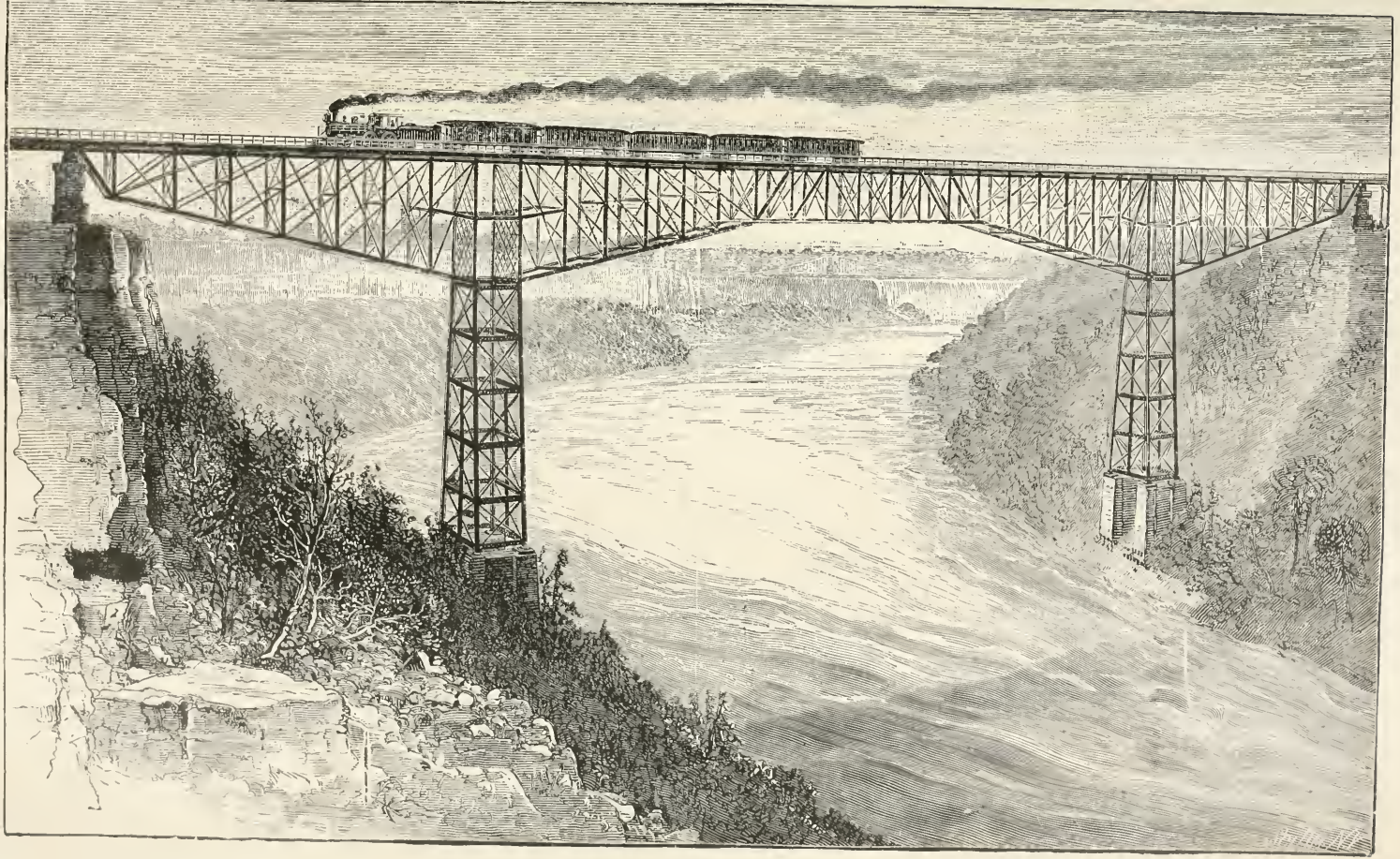
Many people not familiar with the life of great cities think of street railways as a luxury rather than a necessity—as nothing more than a means to gain a little time and save the trouble of walking. The fact is, however, that in the larger cities they are a necessity, a vital and essential part of existence, most vital and essential to the existence of the poorer classes. Let any one take the elevated railroad cars in lower New York city at about six o'clock in the evening, and he will find the trains filled and running over with a crowd of grimy, toil-worn men and women. Only a small part can sit down. The rest stand huddled together like cattle in a stock car. Clearly their riding is no luxury, but a necessity. They are bound for their homes, miles away on the outskirts of the city, or perhaps in Brooklyn or Jersey City. They have to ride because their homes and their work are far apart, because there is no room for them to live in the crowded center of the city where they find employment. Indeed, the greater part of those who earn their daily bread in lower New York city could not live where they do and work where they do were it not for the street and elevated railways and other means of local transportation. So in all great towns. Chicago, a city twenty miles or more in length, is wholly dependent for its unity on its horse and cable railways, and the suburban trains of the steam railways. The indispensable condition of building up a

new quarter of that city is a street railway, to take the people who are to live there to and from their business. The laying of a new line of cable road out into the uninhabited prairie is surely followed by the springing up of a new suburb.

It is a familiar fact, that as the population of the country increases it tends more and more to aggregate in great towns. The cities are not only growing with the growth of the country, they are growing faster than the country as a whole, much faster than the rural districts. Nor is this in any way an accidental or temporary state of things. On the contrary, it is the necessary outcome of industrial conditions, and must continue. Of all the occupations that men pursue, that of agriculture is almost the only one that can be advantageously carried on by scattered workers. All the rest—trade, manufactures, the professions—are town occupations; can not successfully be pursued except where large numbers of men are gathered together. Since, as the occupations of men become more diversified, the number of those engaged in agriculture necessarily diminishes as compared with the whole number, it follows that the cities must continue to grow more rapidly than the rural districts. It is this fact that gives peculiar and urgent significance to the problem of the distribution of population in cities by city passenger transportation.

Industrial conditions demand that men should work in dense aggregates. But humanity demands that they should not live in dense aggregates. Humanity demands that men should have sunlight, fresh air, the sight of grass and trees. It demands these things for the man himself, and it demands them still more urgently for his wife and children. No child has a fair chance in the world who is condemned to grow up in the dirt and confinement, the dreariness, ugliness, and vice of the poorer quarters of a great city. It is impossible to think with patience of any future condition of things in which such a childhood shall fall to the lot of a large part of the human race. Whatever struggles manhood must endure, childhood should have room and opportunity for development, for healthy moral and physical growth. Fair play and the welfare of the human race alike demand it.

There is, then, a permanent conflict between the needs of industry and the needs of humanity. Industry says men must aggregate. Humanity says they must not, or, if they must, let it be only during working hours, and let the necessity not extend to their wives and children. It is the office of city railways to reconcile these conflicting requirements. In so far as they are



Cantilever Bridge, Niagara River.

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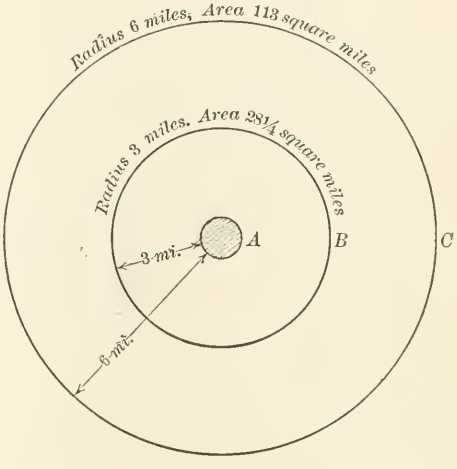
efficient they enable men to work in dense aggregates and yet live in decent isolation. The greater the speed, the capacity, the cheapness of the transportation they furnish, the more possible is it to secure to the poorest classes the conditions of healthful and moral living by increasing the extent to which a given industrial population may be spread out. Supposing a given city to be supplied with street railway lines radiating in all directions from its center, it can be shown that an improvement in the motive power which should double the speed of the cars would render the area available for the residence of those whose daily work is near the center of the city four times as great as it was before, and hence, supposing the population remained the same, give an average of four times as much space for each inhabitant. A diagram will make this clear.



Suppose the black spot A to be the district near the center of the city where the inhabitants assemble daily to work. Suppose also that the longest time the people are willing to spend in riding to and from their work is half an hour, and that the speed of the cars in the first instance is six miles an hour. People can then live not more than three miles from their work, and the area available for residence will be represented by a circle B, whose radius is three miles and whose area is twenty-eight and one fourth miles. But if the speed of the cars is increased to twelve miles an hour, the people can live six miles from their work, and occupy the whole area of the circle C, whose radius is six miles and whose area is one hundred and thirteen miles, or four times as great as before.

Although, of course, this illustration does not correspond to any actual case, and ignores the more complex elements of the problem, yet it by no means exaggerates the influence of urban transportation on city life, or the benefits that may come from improvements in even one department of the service.

In the length of her steam railways and in the extent of the business done upon them the United States rivals all the rest of

the world; in the development of her street railways she far surpasses it. Over two billion passengers ride yearly on our city railways, nearly or quite twice as many as in all other countries together, and over four times as many as ride upon our steam railways.* An index of the part the street railways play in the daily life of the people is found by a comparison between the number of inhabitants in the various cities and the number of rides taken yearly. In cities of over one hundred thousand inhabitants the average number of rides per inhabitant varies from 65 to 297,† the latter number pointing to an average of about two

* *Railways and Street Railways compared.* (*From the Eleventh Census.*)

	Steam railways.	Street railways.
Length of line (miles)	157,759	5,783
Number of passenger cars	25,665	32,505
Number of employees	704,743	70,764
Number of passengers carried	472,171,343	2,023,010,202

† *Relation of Street Railway Passenger Traffic to Population in Cities of over 100,000 Inhabitants in 1890.* (*From the Eleventh Census.*)

Cities.	Population.	Number of passengers carried.	
		Total.	Average number of rides per inhabitant.
Baltimore, Md.	434,439	40,659,982	94
Boston, Lynn, and Cambridge, Mass.	574,232	129,038,563	225
Brooklyn, N. Y.	806,343	147,500,399	183
Buffalo, N. Y.	255,664	16,685,983	65
Chicago, Ill.	1,099,850	180,326,470	164
Cincinnati, Ohio	296,908	37,905,370	128
Cleveland, Ohio.	261,353	39,164,773	150
Denver, Col.	106,713	21,535,735	202
Detroit, Mich.	205,876	22,791,566	111
Indianapolis, Ind.	105,436	9,863,000	94
Jersey City and Hoboken, N. J.	206,651	24,115,322	117
Kansas City, Mo.	132,716	38,000,978	286
Louisville, Ky.	161,129	21,281,584	132
Milwaukee, Wis.	204,468	14,512,156	71
Minneapolis, Minn.	164,738	14,648,529	89
Newark and Elizabeth, N. J.	219,594	20,068,884	91
New Orleans, La.	242,039	30,510,662	126
New York, N. Y.	1,515,301	449,647,853	297
Omaha, Neb.	140,452	11,900,000	85
Philadelphia, Pa.	1,046,964	165,117,627	158
Pittsburg and Allegheny, Pa.	343,904	46,099,227	134
Providence, R. I.	132,146	18,473,722	140
Rochester, N. Y.	133,896	11,372,596	85
St. Louis, Mo.	451,770	67,800,252	150
St. Paul, Minn.	133,156	11,245,805	84
San Francisco, Cal.	298,997	80,619,005	270
Washington, D. C.	230,392	31,032,187	135
Total	9,905,127	1,701,918,230	172

rides a day for every adult person in the city. The average for all cities of this class is 172 rides yearly for every man, woman, and child. The use of urban transportation in European cities is much less, and, according to the latest statistics attainable, in no case exceeds 87 rides per inhabitant. Berlin, whose street railway system is justly regarded as one of the most perfect in Europe, is credited with this latter number, while London, with her omnibuses and underground railways, is not far behind. The average for the principal cities on the continent is less than 50.

There is no kind of transportation, indeed scarcely an industry of any sort, that has of late had so swift and interesting a development as urban transportation. The length of street railway lines in the United States almost trebled between 1880 and 1890, and the traffic doubtless increased in an equal ratio. The actual increase in tracks and passengers is, however, the least part of the change. In 1880 there were no electric roads in the country, and cable traction was represented by three primitive lines on the Pacific coast. The rapid building of electric railways did not begin until 1888, and over half of the cable roads in operation at the present time commenced running later than the beginning of that year. In 1890, statistics collected by the United States census showed one hundred and forty-four electric and forty-eight cable railways in actual operation, out of a total of seven hundred and eighty-nine, besides many more of both sorts in course of construction. Since that time the construction of lines to be operated by the mechanical motive powers has gone on very fast, while thousands of horses are being set free.

In the midst of changes so swift and radical it is impossible to see with any clearness what is coming. Already there has been an incalculable gain in the elements that chiefly contribute to the efficient movement of city populations, in capacity, in speed, in cheapness of operation, in comfort and cleanliness. While horse railways of the sort prevalent ten years ago averaged about five miles an hour, the electric and cable roads average from seven to fifteen, and their speed, as far as mechanical conditions are concerned, is capable of indefinite increase.

The choice of motive power is a problem whose conditions vary with the size of the city. To illustrate this, one might divide American cities into, say, three classes. The first class would embrace by far the greater number, and would perhaps include all cities having a population of less than two hundred thousand. Cities of this class are at present nearly all served either by horse

or by electric railways. There can be little question that, were it not for the objections to trolley wires and poles, widely entertained by the people and by their representatives in the city councils, horses would in a very few years be wholly superseded. Whether these objections will prove to be without sufficient foundation, or will be obviated by such improvements in the construction of storage batteries as will render that method of operation as cheap and efficient as the trolley system, no one can say. It seems certain, however, that, aside from this objection, electric traction is excellently adapted for cities of this class. It can be made profitable even in quite small cities, where the travel is light and the cars run seldom, perhaps only once in ten or fifteen minutes. In this respect it has a great advantage over cable traction, which, on account of the very large first cost of the plant and the expense of maintaining it, is economical only where there is a dense traffic. The speed may be as high as is consistent with safety, and in the suburbs may well reach fifteen miles an hour.

The second class would embrace all other cities except a few of the greatest, perhaps those containing from two hundred thousand to seven hundred and fifty thousand people. In the less densely populated parts of these the conditions would still be favorable to electricity, and the suburban lines would generally use it. For very heavy travel, however, such as takes place near the center of cities of this size, the cables have many advantages, and in most cases would probably be found preferable. The first cost of cable roads is enormous—six or seven times as great as that of electric roads.* But once in operation, the cables will draw an almost unlimited number of cars with very little additional cost. The electric cars must each be fitted with motors and other expensive apparatus, so that every additional car adds considerably both to the cost of the plant and the cost of maintaining it. Therefore in passing from a very light to a very heavy travel, from a business requiring only a few cars to one requiring many, there is a point, not very clearly fixed, where the saving in the cost and maintenance of the cars on cable roads becomes so great as to overbalance the heavier interest charges due to the greater original cost of the cable roadway, and thus render this motive power more economical than electricity. Other considerations, however, are of considerable importance, especially the configuration of the

* The average total cost per mile of line, of right of way, street construction, land, buildings, and power plant, according to the reports made by the companies to the eleventh census, was, for electric railways, $30,352; for cable railways, $200,472.

streets. Where they are crooked the cables are at some disadvantage, on account of difficulties in construction and the greater wear in turning corners. Where there are steep hills the disadvantage is on the other side; the cable cars are drawn without difficulty up almost any grade, while a rise of about one in six seems to be the steepest over which electric cars can be successfully operated.

Cable and electric roads built upon the surface of the streets will have their place even in the largest cities, but we come now to a class for which they are not sufficient—to vast aggregates of population like New York and Chicago, and those still vaster aggregates, the dim cities of the future, whose multitudinous humanity alarms the imagination. Here urban transportation finds itself face to face with its chief problem present and to come, the redressing of extreme industrial concentration. Here is the greatest need and the greatest difficulty in meeting it. There must be large transporting capacity, because of the numbers to be moved; high speed, because of the long distance from the center of the town to the open suburbs; cheapness, in order that the poorest classes may share the benefit. A few of the characteristics of efficient means of transportation for the largest cities may be laid down with some certainty.

The tracks must not be upon the surface of the streets. A rapid and regular movement of cars is out of the question upon a roadway which is shared with other vehicles. There must be at least four tracks, two for trains going in one direction and two for those going in the other. One of these two must be for local trains making many stops and carrying people from one point to another in the city; the other must be for express trains, making few stops and carrying people swiftly to or from distant suburbs. Trains stopping every few blocks, as local trains must, can not maintain sufficient speed to meet the needs of the outlying districts. The elevated railroads of New York city, which have only two tracks and can therefore run only local trains, are able to attain a speed, including stops, of only about ten miles an hour. That of the express trains should be at least twenty.

Since the tracks can not be upon the streets, the only part of the surface of the ground available, they must be either above the ground or beneath it. At present, on account of the noise, unsightliness, and inconvenience of overhead structures, the best opinion seems to favor the underground plan. There appears to be no sufficient reason why underground travel should not, by

the liberal use of electric lights, ample ventilation, and the employment of electricity or some other smokeless motive power, be made as pleasant as travel aboveground. Whether the underground passage can most advantageously be placed just under the street, as contemplated in New York, or deep beneath the surface, as in the case of roads recently constructed in London, is not yet determined, and may depend on the kind of soil to be dealt with, and other local circumstances. The whole matter is as yet in the experimental stage, since not one of the world's greatest cities has at present anything worthy to be called an adequate system of urban transportation.

Urban transportation, being of the most momentous importance to the daily life of the people and not subject to regulation by competition, should, if not actually owned by the municipal government, be subject to authoritative control. Municipal ownership is as yet untried in this country, although it has many advocates, and some cities, in granting franchises to street railway companies, have reserved the right to purchase and operate the lines at the expiration of a fixed period. The present system is one of private ownership and operation under municipal regulation. Supposing this system to continue, the aim of regulation should be to secure the most efficient transportation at the lowest possible price. On the one hand, it should insure that the people pay no more for the service than shall secure to the companies a reasonable return on the capital actually invested; on the other hand, it should be such as to give investors and projectors ground for expecting fair treatment and permanent if not large returns. Unfortunately, such regulation as is practiced in most American cities accomplishes neither of these ends. It permits some of the companies to make enormous profits which ought to be shared with the people by reducing fares, and it is at the same time so fickle, so little to be counted on for the future, that conservative capitalists are shy of street railway investments; while the companies, in view of the uncertainty of the future, seem to themselves to be justified in making all they can in the present. Under this plan, or lack of plan, street railway companies look after their interests by taking part in local politics, and much of the money which the people pay for transportation goes into the pockets of ward "politicians" and corrupt legislators or city councilmen.

Doubtless much of this evil must remain until there has been a considerable change for the better in the administration of our city governments; but one suggestion may be made, whose car-

rying out would be neither difficult nor unfruitful of good results. Much of the present difficulty arises from the obscurity which cloaks the operations of street railway companies. A few States, notably New York and Massachusetts, require from them annual reports exhibiting their financial status and the operations of the year; but elsewhere, for the most part, the public knows nothing of their condition except from vague and contradictory rumors. This secrecy is hostile both to the interests of the public and to those of fair-minded street railway investors, and it fosters corruption, blackmail, and unwarrantably high fares. Every State should require from the companies detailed reports, for which the blanks used by New York and Massachusetts, and by the eleventh census of the United States, may serve as models. The census blanks are the latest and most complete. Should the State legislators neglect the matter, the cities themselves should take it up, and make the rendering of such reports the condition of granting of new franchises or of extending old ones. Complete publicity in the affairs of all *quasi*-public industries is the first condition to a fair adjustment between the interests of the public and those of the investors in these industries. Publicity secured, the proceedings both of the companies and of the public authorities will be scrutinized by an intelligent public opinion, and the first step toward efficient regulation will have been taken.

Thought-Transportation.

There are some analogies between the processes of the "body politic," or social organism, and those of the individual body which are more than analogies, which seem rather to approach a true identity of function, pointing to and illustrating that universal kinship of all forms of life which the newest philosophy teaches us. Such an analogy is that between the nervous system of the body and the means of transmitting intelligence from one part of a country to another. Telegraphs, telephones, and the mail, like the nervous system, perform functions indispensable to a high development. They are the co-ordinating mechanism by whose means the actions of all the other social organs are brought into right relations one with another, and made to work together for social ends. They tend to produce in every part of society a consciousness of what is going on in every other part.

We see this in industrial life. The rapid growth of interdependence among industries which has so often been insisted on in this paper could not take place without a corresponding growth

in the co-ordinating mechanism in the arrangements for the swift communication of industrial information. Industrial capability is helpless without the knowledge what to do with it. The facts upon which this knowledge must be based are communicated by correspondence, by advertising, by telegraphic reports of prices, of movement of commodities, of amount of production, and of other important commercial facts. These means of communication tend to produce something like unity and self-consciousness in industrial society. They enlarge markets through the power they give of watching distant transactions, and of buying or selling at a distance. They thus make the whole body of industry sensitive to the influence of changes in any part of it, and favor equality in prices and wages, and the prompt redressing of local excess or deficiency.

So with political and social life. The daily newspaper, which is above all a bulletin of telegraphic information, brings together in little the thought and feeling of every part of the country, and of each class in the community. As a result of this wider information and sympathy, there is rapidly growing up an eager interest in every sort of social question. A great strike enlists on one side or the other the passionate interest of half the intelligent people on the continent. If poverty, misery, and wrong remain, it is not because people do not know and care about them, but because they are not wise enough to discover a remedy. Within fifty years the world has awakened from lethargy to an acute and eager self-consciousness—a consciousness not without pain.

Thought-carriage, like the forms of transportation already discussed, is in the course of a surprising development. The telegraph and cheap letter postage date from about the middle of this century, while the telephone industry is but twenty years old. At present the number of letters and packages sent through the United States mail, according to the report of the Postmaster-General, is over four billions yearly, and the number of letters, of which no exact record is kept, is doubtless at least two billions. The number of messages sent by telegraph is perhaps seventy-five millions,* of telephone conversations four hundred and fifty millions.†

* The number of messages sent by the Western Union Company in 1890 was 55,887,762.

† A bulletin of the eleventh census gives the following statistics of the telephone industry in 1890:

Total investment	$72,341,787
Gross earnings	$16,404,503

Suspension bridge at Cincinnati.

There is every prospect that this development will continue. Our postal service is already, considering the average distance that mail is carried, the cheapest in the world, but there is a likelihood that before many years have passed it will be still further cheapened by the introduction of one-cent letter postage. There is also a continual movement toward the better organization of the means of disseminating industrial information, and many believe that important improvements in this respect are forthcoming.

The movement for a postal telegraph and telephone service is probably the strongest of the movements having in view the State ownership of important industries. Government ownership of these industries would certainly be much less objectionable than, for example, Government ownership of railroads. Most if not all foreign countries own their telegraph lines, and there is reason for thinking that the service abroad is cheaper, and in that respect at least more efficient, than it is in the United States. The change is open, however, to the same serious objections that apply to other proposed changes of the same character.*

Gross expenses	$11,143,871
Net earnings	$5,260,712
Number of exchanges	1,241
Number of telephones and transmitters	467,356
Miles of wire	240,412
Number of employees	8,654
Number of subscribers	227,357
Number of conversations	453,200,000

* Owing to the illness of Judge Cooley, which had rendered necessary his resignation from the office of Interstate Commerce Commissioner, he was unable to take an active part in the preparation of the preceding paper. It has, however, been read and criticised by him, and some expressions altered to meet his views. As here presented it has his full approval.

CHAPTER III.

TYPICAL AMERICAN INVENTIONS.

THERE is no more interesting or instructive chapter in the history of this country than that which concerns the development of the singular inventive power of our people. In all the other branches of thought and action we can trace this part of the intellectual work of our race for some centuries back in the progress of its civilization. The great increase in the readiness with which mechanical devices have been contrived is particularly characteristic of modern times. It is true that a certain measure of skill in dealing with natural powers is characteristic of the lowest savage, and it is one of the traits which strikingly separates man from the lower animals. It is even as true that all the stages of his advance from the lowest level of savagery have been to a great extent attended and accomplished by successive inventions; but this work went forward slowly until after the period of the middle ages. Even in the matter of weapons for use in war and in the chase—a class of objects which more than any other taxed the skill and ingenuity of early peoples—but little progress was made in the period from 4000 B. C. to the tenth century of our own era. Such inventions as clocks, printing, firearms, and other simple means whereby the interests of man were advanced by the use of natural powers, quickened the minds of people to the advantages which might be had through the exercise of the inventive habit. This stimulus, however, only operated in a slow manner, and the leaven had affected but few minds; and the accomplishments in the way of invention which had been attained at the time when the English colonies were planted in this country were inconsiderable in number. In the beginning of the seventeenth century there were probably not a dozen contrivances in common use among the people which would have seemed very novel to the educated people of Egypt two thousand years before the Christian era. At the present time every large city in the civilized world contains thousands of machines of more or less value to human society which were not dreamed of three hundred years ago.

Although the English-speaking people have been the leaders in almost all the great paths of modern invention, the constructive habit has been separately developed in Great Britain and in the United States. For the first century or more after the advent of the English colonies on this continent the people showed little tendency in this direction. There are few and scant traces of the existence of the inventive faculty in the records of this part of our history. Dr. Franklin appears to have been the first person to show a distinct talent for the utilization of the natural forces. His experiments on electricity which led to the construction of the lightning rod are the original and remain on many accounts the most characteristic of our practical American inquiries. The exceedingly direct way in which he framed and proved his theory and the immediate manner in which he turned a purely scientific discovery to practical use is typical of the best work which the later inventors have done. It is characteristic of much of the best work which has been accomplished by the English-speaking people that they have mingled their search for knowledge for its own sake with that which has reference to human needs and to personal profit.

It is often said that "necessity is the mother of invention," but the history of the constructive work of this country appears to disprove the aphorism. At no time in the life of our people has the need of labor-saving contrivances been so great as during the first hundred years after the settlement of the country; yet, as we have noted, this was, as far as mechanical contrivances were concerned, a peculiarly barren period. Apart from the work done by Franklin, we find little trace of the awakening of the inventive faculty among our people until after the time of the Revolutionary War. Two diverse conditions then led them to turn their attention to this kind of intellectual work. The Federal Constitution authorized the General Government to issue patents for new and useful inventions, which secured their exclusive use to their authors for a term of years. This put a premium on inventive skill, and made it possible at a relatively small cost for the contriver to retain the sole use of his machine or process for a considerable time. The real stimulus which quickened them to activity in invention appears to have been applied through the extension of general education. In part this work was done by the schools, but probably in larger measure through encyclopædias and newspapers, which gave to the people a body of information concerning the mechanic arts which had previously

been inaccessible to them. In yet larger part the education was doubtless brought about by the diffusion of machines such as the steam engine, each of which is sure to prove a school for the development of the inventive faculty in the minds of all those who come to understand the meaning and use of its parts. Whatever the assemblage of influences were which led to the development of the contriving humor among our people, this spirit has grown with amazing swiftness, and is now one of the most characteristic elements in our American life.

The development of the inventive habit varies greatly in different parts of the United States. The largest number of inventions in proportion to the population has come from the New England district, where the conditions of the country led to the establishment of manufactures of varied kinds at an early stage in the history of the country. In the pioneering state of the Western districts the number of inventions has always been limited; but as the industries have become organized, as manufacturing work has been begun, and as the schooling of the people has extended, the inventive habit has spread over the continent. It has always been least manifested in the Southern States, but with the progressive diversification of the industries of that part of the country we note a constant increase in the number of inventions. The regional distribution of the constructive motive and its steadfast advance with the progress of manufacturing industry clearly indicates that the effect arising from the use of machinery on the intelligence of the people is very great, and it leads us to the conclusion that the principal agent in promoting the inventive humor is found in the use of mechanical appliances.

As yet the principal inventive work which has been accomplished in this country has been done by people of English blood. Immigrants from Ireland or continental Europe have so far shown little inclination for such constructive activity. This is probably due to the fact that these people for some generations are apt to remain in the lowlier walks of life; they are not likely to acquire much general information, or to have the share of leisure which appears necessary for the peculiar labor required to perfect an invention. It is also a noticeable fact that few inventions have been made by women. None, indeed, which have involved difficult considerations have come from women in this or other countries. This limitation is doubtless due to the very narrow range of education and employment in that sex. In other lines of intellectual endeavor in this and other countries women

have shown that they possess the constructive imagination to almost if not quite the same degree as men. These features in the distribution of the inventive faculty clearly indicate that it is one of the dormant capacities of men which may be readily awakened by circumstances which serve to give a particular stimulus to their minds. So far the quickening of this capacity has been left altogether to accident, but it is clearly a question of great importance whether a shorter and more effective way to this highly important end can not be attained by some system of deliberate education. In the opinion of the present writer, much can be done by recognizing the fact that inventiveness can readily be developed in men, and that a system of schooling may easily be devised which will not only stimulate this faculty but provide an education which will direct the work. A glance at the models and records of the United States Patent Office will at once show the observer that by far the greater part of the inventive work of this country is misdirected and futile. A large part of this waste of ability and toil might be avoided by a proper training in the principles of mechanics and the other sciences which bear upon the work.

In the first stage of American invention the contrivances were of a simple nature and followed a number of obscure paths With the progress in the work there has been a manifest tendency to direct the endeavor toward particular lines of accomplishment. Now and then a path-breaking invention, such as the sewing machine, the reaper, or the electric telegraph, has opened a new way for the application of power in the arts; each such contrivance at once commands attention, and leads a throng of contrivers to work which has for its object the improvement of the particular machine. In this way it has come about that American invention from decade to decade has set in certain directions. At the present time the drift is toward electrical inventions—a branch of inquiry which now receives the attention of more and more able men than any other department of the economic arts.

The careful observer can note in his study of the streams of invention in this country the effect of the conditions of their life on the American people at almost every stage in the history of the last hundred years. For a long time during the period when our agriculture was most rapidly extending the inventions related largely to this art. The reaper and mower, the thrashing machine, and the various forms of tillage implements having for

their end a cheap and rapid method of dealing with the fields, depict the need and high price of labor in this country. The period of the civil war turned the attention of the folk back to the primitive tasks of fighting. The extension of our railway system vastly increased the share of the contriving work which was directed to improvements in locomotives and other railway carriages. Up to 1860 the arts of the miner and the quarryman had been neglected; the tools and methods which were employed were substantially those which had been inherited from the Old World; the exceeding growth of all forms of mining since that time has led to the devotion of a large amount of skill to the improvement of its methods, with the result that this kind of work has made amazing gains in nearly all its branches.

Although there is a general relation in the inventive work of all countries, and a rather close connection between that of Great Britain and of the United States, such as is natural between two peoples of the same blood and language, the contriving work of this country presents a number of features which are peculiar to it. It appears to be characteristic of American inventors that they have a faculty of bringing their work to the useful stage more rapidly than the kindred minds of the Old World. The greater number of the mechanical contrivances which have appeared in Europe have required a generation or more to bring them to the condition where they had an economic value. It is very common, indeed, in that part of the world for very important suggestions in the way of improvements to lie fallow for decades, and to await changes in the original plan before they proved valuable in the arts. The way between the first conception of the novelty and its introduction into general use is far shorter with us than abroad. In part this feature is due to the intensely practical tone of the Americans. In some measure it is to be explained by the fact that American capitalists are more versatile in their humor than those of Europe. They are always ready to consider the value of inventions, and to support the mechanician with the business skill and energy without which the most advantageous contrivance is sure to prove unprofitable.

Something of the intensity in the economic motive which exists among our American inventors may be noted by considering some of the trends of their work. It is an interesting fact that the needs of the household were the first objects of our American inventors. By far the greater part of the labor-saving improvements which are used in domestic life have originated in this

country. Franklin and Benjamin Thompson (Count Rumford), who were among the earliest of our American-born inventors, directed their attention to the needs of the kitchen, and greatly advanced the methods of our fireplaces. Since their day others have developed the stove, until the American forms of that contrivance are the most economical and in every other way the best adapted to the needs of the people of any fireplaces in the world. These improvements in domestic economy cover a wide range of mechanical appliances. It is not too much to say that they have halved the labor and greatly increased the comfort of our homes.

Although the sphere of household contrivances is particularly that of the American inventor, his accomplishments are indeed distributed over a singularly wide field; they have, in fact, a greater range than those of any other country. It would be interesting to trace in outline all the paths which have been followed by our constructors, but such an undertaking would require an essay at least as extensive as the whole work of which this writing forms a small part. We shall therefore have to limit ourselves to a brief consideration of certain main lines of inventive labor which are perhaps the most important of those which have been traversed by our mechanicians.

As before remarked, the greater part of the inventions which have been initiated in this country have in a measure been elaborated on lines which were laid down in the last century. Almost all the inventive work which plays an important part in our civilization has been done by the co-operative labor of British, American, German, and French mechanicians. There are, however, several parts of this great field of endeavor which have been mainly cultivated in the United States. Of these—partly because the story can be briefly told, and partly because the telling seems to be important for the task we have in hand—we shall note three, viz., electrical invention, railway construction and appliances, and shoemaking machinery.

In the department of electrical inventions the mechanicians of this country have ever held the foremost place. Although not the first in this field, the contrivances of Benjamin Franklin were on many accounts the most startling and inspiring of all of those which have been made. The electric telegraph first came into practical shape through the labors of an American inventor, and in the time of our own generation the discoveries and inventions of Thomas A. Edison, Alexander Graham Bell, and a host of others, have done much to give this country a distinguished place

in science and art. The department of electrical invention has been presented by Mr. Kennelly with Mr. Edison's approval.

Owing to the peculiar needs which have affected the development of this country, railways have taken on an extension and have assumed a relation to the people such as is found in no other land. Although in their original form these ways first took shape in England, American ingenuity has had much to do with bringing them to their present state of perfection. We may fairly say that, next after the shoemaking machinery, they most distinctly bear the stamp of American invention. They have therefore been chosen as a subject for treatment by Henry G. Prout, Esq., the editor of the Railroad Gazette.

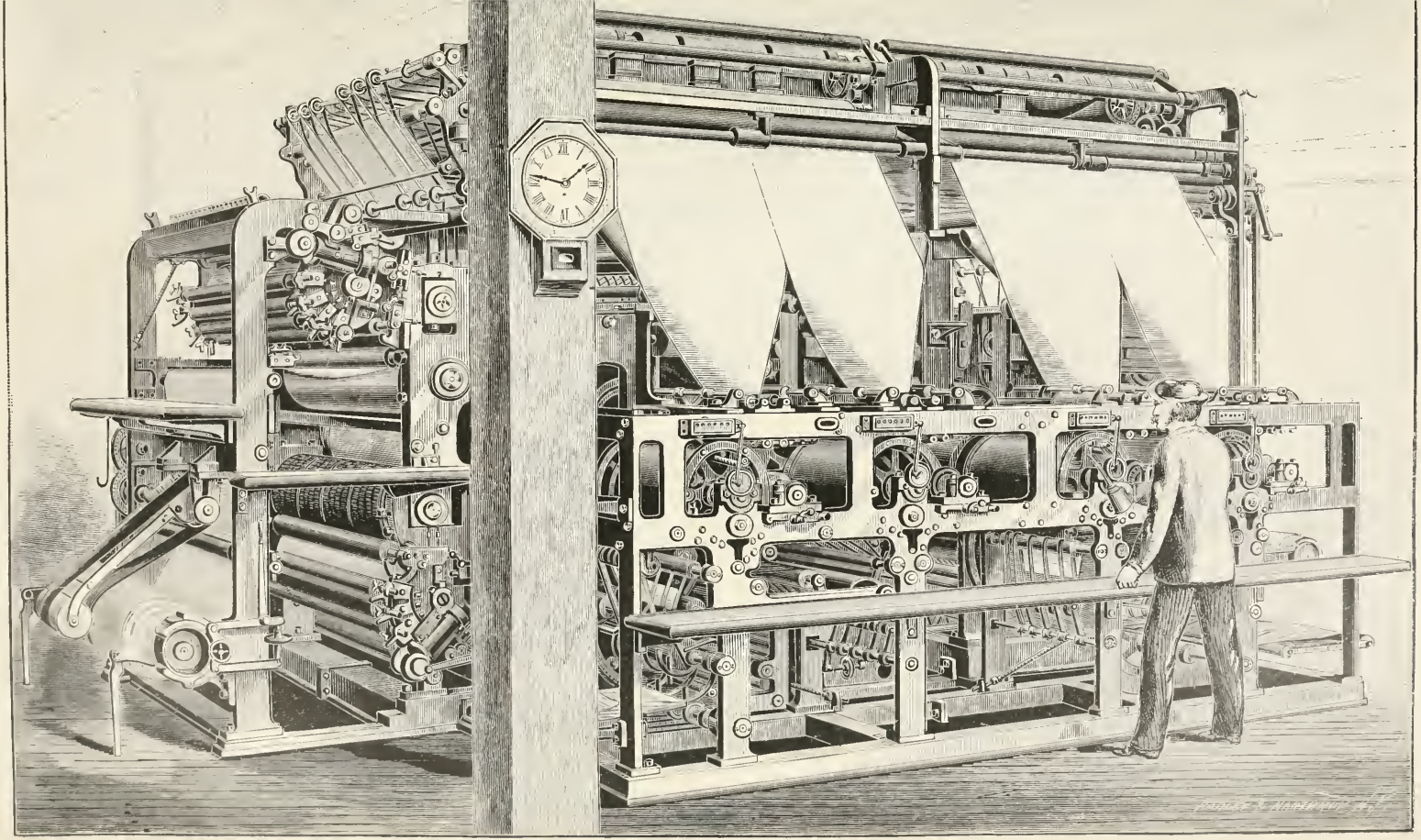
It curiously enough happens that shoemaking, though one of the most ancient of the arts, long remained but little affected by machinery. The cordwainer of old, though belonging to a class of artisans somewhat distinguished for thoughtfulness, remained content with very simple tools, using instruments which would not have appeared to be novel to those of his craft of a thousand years before until more than a century and a half after the settlement of this country. Then, with the awakening of the spirit of invention in America, he set about the task of organizing his very important industry. The steps of his undertaking are best told in the subjoined account of the work, which is from the pen of Mr. Fairfield.

It is to be regretted that the limits of this work make it necessary to omit a history of the great accomplishments of our inventors in other fields. In agricultural implements, in steam engines, and in many other departments of invention, the ingenuity of our people deserves a record which it would require volumes to present.

ELECTRICITY.

Up to the year 1750, electricity, already enrolled in history for three-and-twenty centuries, had made no direct contribution to social progress, or the needs of men. Truly it may have aided intellectual advance by enticing many a truth-seeker, in an all too speculative age, from listless meditation to experimental activity, but utilities it had none.

It is strange to reflect that, five generations back, the adjective *electric* now so brilliantly and intimately welded with memories and realities, must then have suggested only the secluded studies of a few philosophers or a few scientific toys.



R. Hoe & Co.'s sextuple stereotype perfecting printing press, with folders.

But in 1750 the first gift of electricity to art, the first electric invention, appears to have been made by Benjamin Franklin at Philadelphia. It was the lightning rod, that now so generally surmounts tall structures, and reveals its presence by many a high pillar or public statue—more conspicuously, perhaps, than the canons of either science or art strictly demand. Looking over the long list of electrical appliances now in use, it is curious that Franklin's lightning rod, heading the list of dates, is foremost as well in universality of adoption, being still perhaps the most generally employed electrical device in existence.

The eighteenth century closed without finding any successor to this electrical invention. Long it had been waited for and long it stood alone. Its solitude stands in tribute to its inventor, whose versatile talents and native sagacity made him famous alike in letters, science, and public affairs.

But although the latter half of the eighteenth century may claim no electrical applications, it yet contributed to the knowledge of the subject. It established the foundation of measurements in electricity, and hence its claim to be considered as an exact science. It also witnessed the discovery of galvanism by Galvani and Volta. The apparatus, behavior, and effects of galvanic electricity were so different from those of electricity from friction, previously known, that the two were at first supposed to be essentially distinct. The high-pressure frictional machine with its showers of sparks, exhaling ozone, and tingling to touch, was so distinct from the seemingly inert galvanic pile, which was yet so steadily energetic in its action, it was difficult to believe that they generated the same electricity. Years of evolution and development were necessary to prove that the two merged by insensible gradations, and to demonstrate that the electricity of the thunderstorm was the same force that feebly ventures only by the best conducting paths from the galvanic battery or thermopile, and that the diverse manifestations differ only as the water of Niagara Falls differs from that water when flowing in the placid channel of the river St. Lawrence.

While the knowledge of the magnetic needle's directive powers perhaps antedates recorded history, electro-magnetism is essentially a nineteenth century development, and its discovery in 1820 followed in the wake of the galvanic battery. The electric telegraph, that had been the poet's dream in the days of ancient Rome, that was dimly foreshadowed and roughly suggested in outline as early as 1753, and that was worked experimentally

in 1816, had to await the advent of electro-magnetism before launching into reality and life. Nearly all the electrical industries and applications of the present day are connected either directly or in immediate sequence with the developments of electro-magnetism, and we may fairly expect our nineteenth century to be forever associated with the birth and fostering of this science and its arts. Steam, chemistry, the mechanical and the liberal arts—all these, too, in this century have surely progressed and prospered ; but other times have also known them, and in the year 1800 not one of them was new, while electro-magnetism, sprung from the two sciences that first united in its name, was unknown until 1819 or 1820.

The career of that part of the world's work in electricity and electro-magnetism which America has developed since the time of Franklin, is interesting to follow, and commences with the year 1828. The first experiment in exciting steel magnets by electricity was made in France in 1820, a few months after the discovery that a wire carrying a current of electricity exerted magnetic influence upon a compass needle in the vicinity. Of the nature of that influence we remain still in ignorance. All that we can assert is that electricity and magnetism are not material, and that their manifestations are associated with energized matter. It seems probable that electric or magnetic energy consists of some particular kinds of motion in matter, just as heat is now supposed to be a vibratory motion continually existing in the molecules of substances. Beyond this probability we enter the region of pure speculation.

The first electro-magnet having soft iron cores, wound with copper wire, excited by a galvanic battery, was constructed in England in 1825. Three years later, in the summer of 1828, Joseph Henry, Professor of Mathematics in the Academy of Albany, N. Y., initiated a series of researches in electro-magnetism which resulted in important discoveries and inventions. In 1829 he exhibited an electro-magnet, itself weighing some 12 ounces, which, when excited by a current, supported from its keeper a weight of 39 pounds. Next year he had a magnet weighing 21 pounds, that under excitation supported 700 pounds ; and in the year following (1831) a third, which, weighing 23 pounds, supported 2,063 pounds.

In 1831 Henry led the van of electro-magnetic research. He had discovered the key to the fundamental principle of the dynamo-electric generator—that the motion of a conducting wire

relatively to the poles of a magnet, generally sends, or tends to send, a current of electricity through the wire. We have seen that electricity in motion through a wire—or, in other words, an electrical current—was in 1819 found to have magnetic properties. Here in 1830 the converse relation was first noticed, that a conductor in motion through magnetized space developed electrical properties. The proposition in these terms did not receive full proof or recognition for some years, and then at other hands, but Henry seems to have been the first to observe an electrical current induced by a magnet.

Guided by experiment, Henry was also the first to practically realize the general conditions suited to the winding of electromagnets for special purposes. In 1830 he had distinguished in the phraseology of that time, between a "quantity magnet" and an "intensity magnet." The former was wound with comparatively few turns of coarse wire, and was suitable for excitation from a battery in the immediate vicinity, composed of a small number of cells in series but with large plates, this arrangement being then known as a quantity battery capable of supplying a strong current through a short, thick wire. When the magnet had to be moved away from its galvanic supply, the two conducting wires maintaining the circuit offered a resistance to the electrical pressure of the battery, which greatly reduced the current strength, and thus enfeebled the magnet's powers. To restore these it was necessary to introduce a greater battery pressure by employing a greater number of cells in series, or an intensity battery, as it was called, and also to wind more numerous turns of thinner wire on the magnet in order that the current circulating round it might compensate in the number of convolutions for the diminished current strength. By this device Henry was enabled to produce magnetic effects of considerable power at a distance of several hundred feet. These principles, which he grasped by the intuition born of experience, and which for several years afterward dimly made themselves felt in the minds of many a worker in electricity, finally received adequate quantitative expression in the theory of Ohm, and their principal embodiment appeared in 1840 as Ohm's law—that the current steadily flowing through an electric circuit was in ampères equal to the total electric pressure in the circuit or its electro-motive force, in volts, divided by the total opposing resistance of the circuit stated in ohms.

In the years 1830–'40, before the announcement of Ohm's law, many conditions were discovered essential to the successful opera-

tion of electro-magnetic effects at a distance from their galvanic source or battery—conditions that, in the light of modern methods, would be self-evident. It appears probable, from the record, that the success of Morse's telegraph at the critical period of its initiation, was partly owing to the relations which Henry had experimentally determined between the length of the conducting circuit and the winding of the coils on the receiving magnet.

Henry's discoveries and inventions up to the end of 1832 were made under considerable disadvantages. He appears to have been so closely occupied during term time by the routine of his daily teaching, that his experimental work was only possible during the few weeks of vacations, and even when his time was his own, the material and apparatus he required must have been collected and put together with considerable difficulty. But in the years that followed 1832, after he had removed to Princeton College, when he probably possessed more leisure for research, his work, while versatile and abundant, never exceeded in originality that accomplished under earlier disadvantages. From 1835 to 1842 he published a series of electro-magnetic researches which led scientific advance in their own direction, and have since become the basis of many useful applications. So well recognized has been his title to originality and success in these researches, that a movement has been inaugurated in America to give his name to one of the later electro-magnetic units which has demanded denomination and title. The proposition has been favorably received in other parts of the world, and there is every hope that, at the Chicago Convention and Electrical Congress of 1893, the name Henry will, by general consent, receive the guerdon of our race, in company with the already familiar names of Ohm, Volt, and Ampère.

Electro-magnetism laid the foundation of the modern telegraph. The first electric telegraphs were tried experimentally thirty years before Morse's first celebrated dispatch flashed over the wire from Washington to Baltimore, on May 24, 1844. Apart from the unripeness of the season in which these first telegraphs appeared, they labored under two difficulties. They operated by high-tension electricity, the only form then generated, and they required a considerable number of conductors. It is no wonder that in the days when the little even yet known concerning insulating substances had not been dreamed of, a system requiring thousands of volts to operate it should have overtaxed all attempts at its extension. The wonder gives way to admiration for the courage which

could obtain even a partial success from such uncontrollable elements. It was not until galvanic electricity was employed that telegraphy became feasible, and not until the electro-magnet was discovered that feasible telegraphy became practically successful. Even then the development was more rapid in Europe than in America. A telegraph line one mile in length worked at Göttingen in 1834, and continued in use for several years. All the early magnetic telegraphs of Europe employed as receiver a magnetic needle set within a coil of wire, and the signals were read from the oscillations of that needle, under the alternated directions and intermissions of the signaling current. It was Morse, however, who first applied the electro-magnet to receiving the signals, not alternated in direction, but composed of dots and dashes, with appropriate intermissions. The great attractive power of the electro-magnet enabled him to register these signals, and his system was the first to automatically record its messages, employing at the same time a single wire. Gradually the convenience, simplicity, and adaptability of the Morse system supplanted the earlier telegraphs of Europe, until at the present time their almost sole surviving stronghold is the ocean, for, on submarine cables of one thousand miles or more in length, the Morse system has never yet been able to compete in rapidity with the original alternated current signals. On land, however, except along some lines of railroad, and in a few scattered localities, the Morse instrument holds sway all over the telegraphic world.

Morse was professionally a painter, and attained considerable eminence in portraiture. In 1813, during the war between Great Britain and the United States, his "Dying Hercules" was classed among the first twelve paintings of the London Royal Academy, and its plaster model received the Adelphi gold medal. His versatility resembled that of Franklin, and he found his province alike in the fine arts, in literature, and in invention. Between 1826 and 1832 he became interested in the development of electro-magnetism, then a science without kindred arts. The idea of applying the electro-magnet to telegraphy captivated him completely, and he produced his first working model in New York in 1835. From that time onward he devoted himself wholly to the task of drawing Government attention to the capabilities of his invention. For several years he worked assiduously, often in poverty, but never dismayed. Finally, in 1843, after many reverses that might have reduced to despair a man of less ardent temperament, an appropriation bill, granting him sufficient money to build an ex-

perimental line between Baltimore and Washington, passed through the Senate five minutes before the adjournment of the session. This action turned the tide of success, but yet another year had to be passed in overcoming difficulties of detail. His first attempt was with a conductor buried by the roadside in leaden tubes, but this plan had to be abandoned at that time as impracticable, and an aërial line was strung on poles. This line, successfully operated in 1844, was the forerunner of the 800,000 miles of wire that have since spread their network over the United States. Morse lived to see that total mileage reach 130,000, to see the world begirt with busy wires, and every wire witnessing in his name the triumph of that period of toil by which humanity was enriched.

In 1834, while Morse was working at his model magnet for the telegraph, another electro-magnet was being studied with a view to application with motive power, in a country village of Vermont. Strictly speaking, the germ of the magnetic motor lay evident in the original discovery of a magnetic needle's motion at the approach of a current. Prophetic insight might have seen in that experiment its future possibilities of motive power, but it needed two generations of workers, and all that those two generations could effect directly and collaterally, to transform that dream into reality, and to exalt that tremulous movement, which a breath might reverse, into continuous rotatory pull with the power of a hundred horses. The earliest American worker in this field was Davenport, a blacksmith in Brandon, Vt.

Having seen one of Henry's electro-magnets used for separating iron in 1833, Davenport was seized with the idea of applying electro-magnetism to motive power. Without any knowledge of electro-magnets, and without books or information, he devised in 1834 an electro-magnetic engine consisting of a pair of permanent horseshoe magnets fastened back to back, fixed horizontally to an upright shaft, and moving round that shaft past the faces of two fixed electro-magnets which were excited from a galvanic battery through contacts made automatically at the right points, so that electro-magnetic attraction and impetus would be delivered to the revolving permanent magnets at every half revolution. Davenport applied for and secured a patent for this device in 1835. This was, if we except articles of galvanic body wear which date back to 1833, the first patent granted in electrical inventions in the United States. He continued the experimental development of his electromotor until 1839, effected many improvements in it,

and employed it for driving a small printing press. All his endeavors were toward industrial applications. He tried long and fruitlessly to promote interest in his plans for making larger machines. The time was not yet ripe, and, with the galvanic battery as the source of power, he was unconsciously helpless to compete with the steam engine; for, while a galvanic battery can indeed supply power with very little waste from the consumption of zinc, and the waste of energy in a steam engine and boiler is never less than seventy-five per cent of what should be theoretically obtainable, yet zinc costing one hundred and fifty dollars per ton has very little chance against coal at two dollars per ton as regards fuel economy on a large scale.

Davenport also constructed in 1835 small circular model railroads, on which ran an electro-magnetic motor carrying its own battery. One of these is still preserved. His apparatus appears to have been in advance of anything of the kind which was then existing.

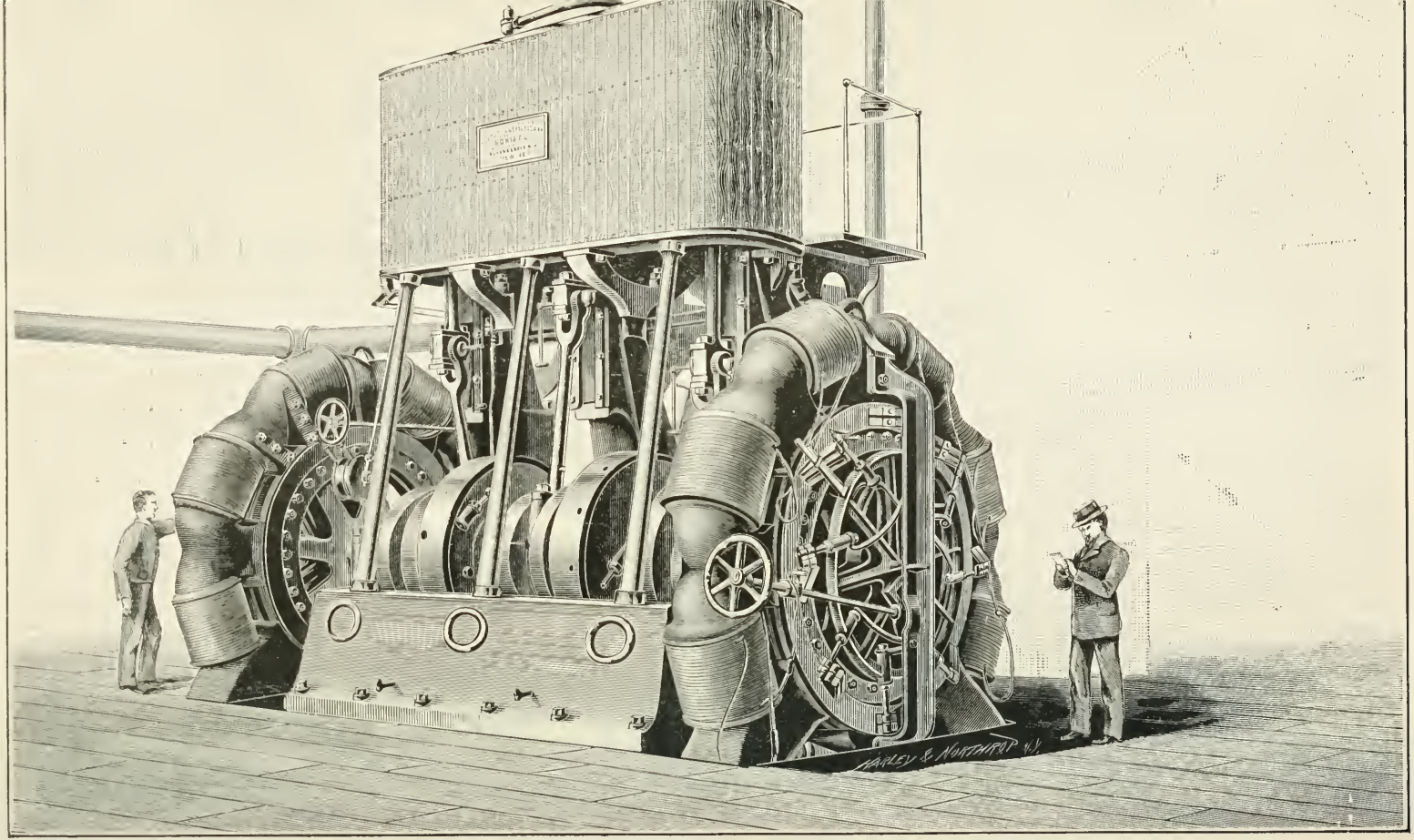
No further American developments of any importance took place from 1835 until 1850. It seems probable that the extension and improvements of telegraphy occupied nearly all the attention of the day. In 1850, Professor Page, of the Smithsonian Institution, experimented with electro-magnetic motive power applied to railroads. In 1851 he made a trial trip on the Washington and Baltimore Railroad with a sixteen-horse-power motor worked by one hundred cells of Grove's battery. With this he attained a speed of nineteen miles per hour. Although this demonstrated the capabilities of electric locomotives, it also proved that the cost of propulsion by battery power was prohibitive. A few desultory trials in the same direction were made from time to time by others, with the same results. Electric motive power was struggling to escape from the paralyzing costliness of galvanic supply. In Europe similar conclusions had been arrived at.

It may be said that the first half of this century produced the electro-magnet, the telegraph, electroplating, early forms of the magnetic motor, the germ of the dynamo generator, and the first ray of the electric arc. The steady development of already existing electrical applications was not broken by any important invention until 1872, the year that marks a revival of electrical activity in every direction. The particular event of that time was the practical introduction of duplex telegraphy by Stearns. Up to that date there had been little need of increasing the carrying capacity of telegraph lines. Methods of doubling this carry-

ing capacity by sending messages in both directions over a wire at the same time, or working them "duplex," as it is termed, had indeed been suggested and discussed, but Stearns first carried the plan into practice. The system rapidly developed, and with numerous modifications has since come into extended use all over the world. The fundamental principle is in nearly every case the same. At each end of the "duplexed" line, an electrical imitation of it is made up with coils of wire and other devices. This duplicate or imitation circuit is termed the artificial line. The connections are so arranged that, when each station sends in turn, the outgoing signaling currents divide equally between the actual and artificial lines. The current in the actual line operates the apparatus at the distant station in the ordinary way, but does not influence that at the sending station, owing to the counteracting effect of the current through the artificial line. So soon as both stations begin to signal at the same time, the currents along the actual line oppose and block, those in the artificial lines continuing undisturbed, and their preponderating influence operates the apparatus at each station. In duplex working, the signals are therefore received from the distant operator at the moments that he occupies the wire alone, and from the sending current itself whenever the currents from both ends meet.

Nearly every important circuit in the world, aërial or submarine, is now worked in the duplex way, and by this means the capacity of those lines for traffic is during times of pressure fully doubled.

In 1874, Edison, then a telegrapher, developed a quadruplex system of telegraphy. He had already given evidences of that fertility of invention which has been the greatest characteristic of his work. In 1873 he had exhibited a chemically acting automatic telegraph, by which, with the messages punched beforehand on a band of paper, which was then passed through a transmitter, speeds had been obtained on short lines far in excess of any that had been considered possible up to that time. His system of quadruplex, which with minor modifications remains in use on a large number of the most heavily worked lines, consists of a plan by which two messages can be sent at once in the same direction on one line, without any mutual interference; and then the combination is duplexed at each end, thus allowing of two transmissions from each end at the same time, or four messages in all. The double transmission in one direction unites two independent systems of signaling—one by



The Edison multipolar dynamo.

varying the strength of current only, the other by varying only the direction of that current. In this way one receiving instrument responds to strong currents of either direction; the other receiver is actuated by currents of one particular direction, whether weak or strong, and these are evidently independent.

In 1876, Prof. Bell, then of Boston University, produced the telephone which bears his name, and which has made so great an epoch in the course of civilization. Prior to the advent of telephony, telegraphy had to be carried on by special agents, and the messages translated into and out of the idiom of dashes and dots. The telephone made the telegraph a general possession. The one virtually annihilated distance between places, the other between persons.

Bell's work had been devoted to acoustics and vocal physiology, so that his researches had led him into the endeavor to transmit sounds electro-magnetically. For this purpose it was necessary that the current transmitted through the line should be undulatory, and that it should make as many undulations per second—from sixteen to about sixteen thousand—as there are undulations in the air which transmit those sounds. In fact, this capability alone would merely suffice to reproduce the musical tones of speech without any of that characteristic *timbre* and quality which we know is associated with the more delicate wavelets superposed like ripples on the main undulations. All these delicate ripples the modern telephone fairly conveys. As the distance over which the transmission is carried increases, these wavelets become gradually more obliterated, and at last the main vibrations themselves fade away.

In Bell's telephone the aërial sound-waves impinged upon the thin ferrotype plate or diaphragm, and set it into corresponding vibration. This diaphragm is included in the magnetic circuit of the permanent magnet of steel which occupies the center of the handle, so that a disturbance in the disposition of the diaphragm relatively to the magnet, alters the amount of magnetism which permeates the circuit. At every undulation of the ferrotype plate there is a corresponding undulation of magnetic intensity in this magnet and in its circuit. Wound upon a wooden spool that is slipped over the end of the magnet near the diaphragm, is a coil with many turns of fine insulated copper wire, that are thus linked with and threaded upon the magnetic circuit, and the undulations of magnetic intensity that surge to and fro through this coil generate in it on the principle of the

dynamo, waves of electrical pressure that are capable of transmitting currents through wires. A similar telephone in the circuit receiving these undulatory currents is magnetized by them, and its coil, acting like an undulatory electro-magnet, attracts its diaphragm in the corresponding rhythmic periods. These mechanical undulations are finally communicated to the listener's ear, either through the framework of the telephone or by the intermediate air. Two such telephones in direct combination as transmitter and receiver essentially form an electric dynamo and motor, and involve in their operation fluctuations of mechanical disposition, magnetism, and electricity, first in direct and then in the reverse order.

Up to this time Edison had devoted his attention almost entirely to the development of telegraphy, but in 1877 he effected an important improvement in telephony, by introducing a transmitter of carbon in combination with an induction coil. The defect of the existing telephone system lay in the feebleness of the generator. If an instrument similar in type to the receiver was employed for this purpose, it was difficult to obtain sufficient current from it over any considerable length of circuit without making the diaphragm too heavy and sluggish for rapid vibrations. Edison having observed, in 1873, that carbon was electrically very sensitive to pressure, powdered carbon conducting very much better when compressed, placed a carbon button under the transmitting diaphragm, so that sound-waves from the speaker's voice set up undulatory pressure upon this button, which remained in circuit with a battery and induction coil. The battery current was thus thrown into undulatory variation, and the induction coil re-enforced the pressure of these undulations and impressed them upon the line. By this means the line currents were produced in sufficient intensity to meet the requirement of long-distance telephony, and the essential features of this transmitter are maintained in all the modern forms of such telephonic apparatus.

The growth of telephony has been so rapid that it is difficult to imagine that the widely extended existing system was only inaugurated fifteen years ago. It is now possible to communicate directly by telephone over one thousand miles of aërial wire, or one hundred miles of submarine cable, these being the approximate limitations of to-day—the reason for the marked superiority of overhead conductors being due to the fact that, the closer a wire is laid to the ground, the greater the quantity of electricity that will be required to charge it. The wire in a sub-

marine cable is virtually brought within about a quarter of an inch of the ground, and its charge—or capacity, as it is termed—is therefore usually some ten times more than that of an overhead conductor supported on poles. Before a current can pass to the distant end of the conductor it must charge the intermediate length, and in submarine cables, the undulatory telephone current is practically all absorbed in the successive rapid charges and discharges of the first hundred miles.

In acoustical experiments connected with the telephone Edison devised the phonograph in 1877. In this instrument the diaphragm of very thin glass, which receives the vibrations of speech, is armed with a little knife or plowshare of sapphire. A cylinder of wax composition runs under this knife, making from eighty to one hundred and twenty turns per minute, the knife at the same time moving slowly parallel to the axis of the cylinder under the influence of a screw having one hundred threads to the inch. The knife thus cuts a long spiral furrow on the surface of the cylinder to a total length of about two hundred and twenty feet, and while vibrating leaves in this furrow the geometrical outline of the vibrations to which it has been subjected by the diaphragm. A permanent record of sound-waves in wax is thus retained on the cylinder. When, instead of the knife, a little sapphire spherule on the diaphragm is allowed to run over the furrow at the same speed, it throws the diaphragm into just those vibrations which produced the record, and so reutters the registered speech.

The next prominent achievement of the age was the production of the electric light. The arc light had undergone a slow but steady course of evolution from the date of its discovery by Davy. At first it was the expensive curiosity and the attendant only of the lecture table, and was sustained by a powerful galvanic battery, and with hand adjustment. Then its unrivaled brilliancy made it a very desirable equipment for lighthouses and signals, so that endeavors were made to sustain it automatically. Since the positive carbon burns away in the arc nearly twice as fast as the negative, special and delicate clockwork was devised to feed the rods forward at the proper respective speeds. The dynamo generator, then a very crude machine, was put into requisition for supplying the current, in place of galvanic batteries, and to this effort the early progress of the dynamo was mainly due. With lighthouses once equipped with dynamos and the mechanism for creating and sustaining the arc, its introduction

was rendered possible into clock towers, exhibitions, and public places. Attempts were made to simplify the mechanism, and the number of devices which have been tried or patented for feeding the carbons can be counted by hundreds, involving collectively an enormous amount of labor. But every year brought some improvement, and scarcely a single attempt, however ill adapted or unfortunate, can perhaps be pronounced absolutely worthless, or of no influence whatever upon the general advance. The work has been well rewarded. In navigation, in warfare, in display, and in public work carried on by night, the arc lamp has been invaluable, and so high is the practical development which its apparatus has already obtained, that at this date fifty of the lamps are commonly worked in one series, in all weathers, and with automatic electro-magnet feed mechanism, so that there is not a city in the country which is not either partly or entirely lighted up by the electric arc.

But, however well fitted for outdoor illumination the arc lamp may be, it is totally unadapted for domestic service and interior lighting, where the very intensity which gave it no rivals in the open field became within doors its chief disadvantage. Nor was it amenable to being diffused and tempered. Like a wild bird, it requires full scope, for if subdued it wanes and dies.

The problem of obtaining a successful electric illumination which should compete with gas was, at the time Edison attacked it in 1878, at Menlo Park, replete with difficulties. He selected the well-known principle of heating a wire to incandescence by passing a strong current through it. The only available substance that would support an incandescent temperature in air for more than a few moments was platinum, and his earliest lamps had burners of that material. It soon became evident, however, that the point of incandescence was too close to the melting point of the metal, and that a very slight excess of current was sufficient to fuse the wire. To avoid irregularities from currents of air, it had to be inclosed in sealed glass globes, and these rapidly blackened during the operation of the lamp. Platinum had finally to be abandoned in favor of carbon, the same substance as that already employed with the electric arc. But while the arc needed rods, Edison recognized that the only practical lamp must be formed of a very slender filament, so as to take as small a current as possible for the amount of light which had to be developed, otherwise the current supply for large numbers of lamps would need prohibitively heavy and costly conductors. Such slender

homogeneous carbon filaments were very difficult to produce. They had to be maintained in a vacuum more nearly perfect than could be produced without the use of the highest type of laboratory apparatus of the day, and when completed they had to possess a reasonable degree of uniformity, in order to be supplied independently from the same mains. Even on the assumption that such lamps could be prepared, and at a cost within the limits of commercial necessities, the whole question of the supply and distribution of current through a network of conductors to large numbers of such lamps was at that time obscure, intricate, and involved in dispute. Several thousand lamps had to be prepared, sealed in globes, exhausted, and tried, before a single carbon filament was found which could be maintained successfully at incandescence. During the months that were occupied in this pursuit Edison knew no rest. With his house within a stone's throw of the laboratory, he would frequently not enter it for days together, and night time only brought a change of illumination upon the scene of work that had illumination for its aim. As a telegraph operator, used to night vigils, he had learned the soldier's and sailor's art of taking repose at any available interval, and, when overcome by weariness, would usually sleep on the bench beside the regretfully relinquished work. It was from the efforts of a persistence which knew no respite that the first successful incandescent lamp gave the light. Even when the lamp itself was assured, in 1879, new methods and appliances were necessary to make its use practicable. The existing type of dynamo, although emerged from the first stages of construction by the researches connected with arc lighting, was still in a very crude condition. In order to fit it for the task of supplying incandescent lamps, it had to be remodeled. The necessary apparatus of every description had to be devised. Within two years from the date of the first successful lamp, Edison had filed specifications for more than one hundred separate inventions, patented in connection with his system of illumination.

After carbon of every available quality and from all parts of the world had been tried, the filaments finally adopted were made from bamboo fibers. Cut to length and gauge, they are bent to shape and heated in closed chambers until the fiber is completely carbonized, retaining only its original structure. The filament is now secured to its conducting clamps upon a glass stem, which is introduced within a globe and sealed in position by machines for that purpose. After having been annealed the lamps are taken

to the air pumps, carefully exhausted, and hermetically sealed. Bases are then attached to them by plaster of Paris, and after being tested they are ready for use.

The annual production of lamps in the United States amounts to about twelve millions, and is rapidly increasing.

Nothing is more striking than the advances that within the last decade have been effected in dynamo machines for the supply of electric current. These are constructed in all sizes up to two thousand horse power, and in quite a variety of forms. The fundamental principle is in every case the same. A series of conducting wires is revolved by power rapidly through a magnetized space, and in traversing this space, or magnetic field as it is termed, becomes the seat of an electric pressure or voltage, which is capable of forcing a current through a circuit as soon as such is completed. How this pressure is created in a conductor cutting magnetized space is a question which remains for the future to answer. At present we have to be content with the fact, and with a general knowledge of the laws which regulate the intensity of the action.

Comparatively early in the history of the dynamo, it was discovered that its functions were reversible—that is to say, the same machine which when driven by machinery supplies current as a generator to lamps or other devices, can be actuated by current as a motor so as to drive machinery, thus absorbing, not yielding, electrical energy. The function of the machine is merely to transmute electrical and mechanical forms of energy, and the direction in which the transformation shall take place depends entirely on the imposed conditions. A pair of such machines, acting one as generator and the other as motor, and connected electrically, form a very effective and flexible means of transmitting power to a distance.

A large generator, absorbing five hundred horse power from a steam engine or turbine, will yield say four hundred and sixty horse power in electrical energy to a similar machine in the vicinity acting as a motor, and this motor absorbing the four hundred and sixty electrical horse power may deliver four hundred and twenty-three at its belt to the machinery that it drives, so that the double conversion of energy has only cost seventy-seven horse power out of five hundred. As the motor is shifted farther away from the generator, the extending length of intervening conductors will absorb more power depending upon their weight and length, but within a definite radius depending upon

commercial factors, it is often much more economical to transmit power electrically, than to install a separate engine and boiler wherever machinery may have to be driven. As the distribution of electrical power becomes more widely scattered and diffused, the economy of the electrical system increases, and for the supply of a large aggregate amount of power to a great number of city consumers in small units, the electric motor is pre-eminently adapted.

Foremost among the applications of the electric motor is the electric railroad. We have already noticed that attempts had been made in this direction as early as 1850—attempts that so far as they were carried were successful in every particular save economy. The moment that electricity could be effectively generated by a dynamo driven from a steam engine, and coal consumed to supply the current instead of zinc, the barrier which had blocked the path of electric locomotion was overturned.

Edison was the first in America to open the attack by an experimental line of railroad two miles long at Menlo Park, employing an electric locomotive taking current from the track; but the work was subsequently carried on by Sprague and others. Each year saw new trials and a nearer approach to practical success. The first electric road opened to the American public was in 1884, and so rapid has been the development of this branch of service, that in the nine years which have intervened nearly every city has built its electric roads. The first motors placed on the cars were of four horse power, making a speed on the level of about five miles per hour. It was soon discovered that, while this speed was well enough for horses, it was altogether too slow for the new requirements, and the power of the motors had to be doubled, with a corresponding increase of speed. In order to surmount heavy grades at a reasonable speed and without undue strain to the mechanism, the present motor equipment is usually about thirty horse power per car; while ten horse power is about the average rate of consumption, the running speed varying from perhaps fifteen miles per hour in suburbs to five or six in more densely crowded thoroughfares.

Electric traction presented at the outset its full share of special difficulties. Apart from all those essentials connected with the supply of electricity to a rapidly moving vehicle, and the disposition of trolley and conductor, the motor had to be placed in a very contracted space under the body of the car. It had to run for hours without attention, without failure, through splashing

rain, sleet, or snow. In its earlier days a motor was a machine to be carefully lubricated, shielded from dust or moisture with fastidious care, and kept under constant supervision. Under a car, however carefully boxed in, it was necessarily exposed to moisture, dust, and inattention. In the sudden change of treatment to which they were subjected, it is little wonder that car motors often failed. The efforts that had to be made to render them hardier and more self-protecting, besides light, compact, and powerful, have already been so far rewarded, that it may be said without disparagement, to have educated engineers in the true principles of motor construction for all classes of work, and the stationary motor of to-day is a better machine than it would have been if the ordeal of trailing its more unfortunate brethren over miles of muddy roadbeds had never been encountered.

One great advantage of the electric motor over the steam engine for locomotive purposes lies in its uniform rotatory motion and the total absence of reciprocating parts. There is a silent smoothness about an electrically propelled boat that contrasts very forcibly with the vibratory motion of the steam launch. In point of economy, however, the advantage is still all on the side of the steamer.

In connection with railroads, a very interesting modern development, of which Edison was one of the inventors, is the maintenance of telegraphic communication with moving trains, but without the use of any direct metallic connection. This system has been successfully demonstrated, but the demand for continuous communication with trains has very rarely warranted the expense of its maintenance.

It is well known that when any insulated conductor receives a charge of say positive electricity, an equal negative charge is found to be lodged upon the surfaces of the surrounding conductors, such as the ground or the walls of a room. The moment that the electrified body is discharged, that induced opposite electrification of the environment disappears also. Whenever, then, an overhead telegraph wire along the railroad is charged with electricity, as occurs at every transmitted signal, an opposite feeble electrification springs into existence over the surface of the ground or of neighboring conductors, such as parallel wires, housetops, or trees. The metal roof of a railroad car will in like manner contribute a certain small share of this opposite electrification, and every time we send a current along the wire this small opposite charge will appear on the surface of all the cars wherever

Phonograph room, laboratory of Thomas A. Edison, Orange, New Jersey.

they may happen to be situated, whether in motion or at a standstill. The charge on the car roof will be greater the longer the car and the greater its surface, as well as the greater its proximity to the line of telegraph wire beside the track. If, as generally happens, the car roof be first insulated by the wooden framework of the car body, and then directly connected with the track through a sensitive telephone, the charges and discharges of the roof will pass through the telephone, and will become audible if of sufficient intensity. At the depot an induction coil connected with the line wire is kept in vibration, so as to give a characteristic buzzing sound, and currents of this vibratory character are generated within it and thrown into the line wire that runs beside the railroad. If all the cars are equipped with telephones in their respective ground circuits, and if they be not too far distant —say not more than forty miles away—they will all pick up this vibratory note telephonically; and if the vibrating coil be controlled with a Morse key so as to make buzzing dots and dashes, the message can be spelled out in the telephones of all the cars along the road. When the station ceases to send, any one car can employ a similar induction coil, and charge its roof with vibratory pressures of say five hundred volts, alternating rapidly in direction so as to give the same kind of note. This will charge the telegraph wires in the immediate vicinity with the opposite electrification in corresponding vibratory impulses, which will spread along the line and can be detected by a sensitive telephone at the depot. Curiously enough, it is even possible to carry on the usual Morse business over the line wire independently of the train telegraph, since the buzzing does not affect those instruments, and the operators at the telephone can distinguish the buzzing signals apart from the regular Morse characters.

Another recent American electrical invention has been Professor Elihu Thomson's system of electric welding. If two iron rods are to be welded end to end by this process, they are inserted opposite to one another in stout clamps, and by these are then brought into contact. A very powerful electric current is then passed through both, across their adjacent surfaces. The heat generated by this current—in the same manner as in the electric lamp—is most intense at the junction, partly owing to the resistance offered to the current by the metallic discontinuity at the contact surfaces, and partly because the clamps conduct away the heat developed in their vicinity. The rods are thus brought up to a

white heat at their junction, and while in this condition the clamps are pressed together, and the weld which then takes place is skillfully assisted with a light hammer. Although the electric method has only special fields of utility, and may not yet supersede ordinary methods for all classes of work, it is yet conceded that the electric weld is as strong as the body of the metal, and considerably stronger than fire can produce by the usual process.

A somewhat similar modern application of electricity due to inventors in this country is shown in the Cowles furnace for the reduction of metallic aluminium from its oxide. Thick carbon rods like those of a large arc lamp are introduced opposite to one another into a brick chamber and surrounded by powdered carbon, alumina, and copper. The current from a powerful dynamo is then conducted through the furnace, entering and leaving by the carbon rods. The heat that is generated in the space between these is developed faster than the badly conducting walls can disperse it, and accumulates until an exceedingly high temperature is reached and the reduction of the metal is completed. Electrolytic methods for the same purpose are also in course of development.

There is a fascination about the electrical transmission of power which is all its own. When we watch engines like those on board some large steamer, throbbing at every stroke and swaying their mighty arms, the instinct of power worship is awakened, and an enchantment seems to surround that mighty disemburdenment of force. Yet the mind grasps the thrust or strain which the engine delivers to shaft or belting, and intuitively realizes that the same results could be produced by sufficient numbers of men all exerting their powers in concert. But in watching the engines of some large electrical power-house tugging at their dynamos, still another wonder is added in the mysteriousness with which that energy glides stealthily from the building guided by those passive and seemingly idle conducting wires, reappearing at the lamps or motors that may be so far away. The difficulty of mentally depicting any mechanism by which the force can be here transmitted adds its own interest to the spectacle.

The progress of electrical arts and industries typically illustrates the utilitarian tendencies of the age in which we live. The workers in electricity of the eighteenth century were actuated by a zeal for inquiry, a knowledge hunger, in which they were for the time almost as completely isolated from their fellows, as

though their researches had been spent in tracing the origin of speech in some extinct and all but forgotten foreign tongue. However great the debt may have been that humanity owed to the diligence of these isolated workers, it remained in most cases unrecognized until long after the laborers had passed away. Steadily the nineteenth century has so far brought knowledge into union with its power, that now the purely scientific discovery which appears at first revelation a mere abstraction, soon becomes invested with practical capabilities. This tendency of the time to enlist all knowledge in the service of humanity has its strongest hold on the American race.

While art has gained much by this closer relationship with science, science has yet gained more. The Pythagorean school of philosophy flourished in Athens and Alexandria for fully a thousand years. The intellectual advances acquired by the studies it fostered are not indeed to be gainsaid, and all the credit that it may fairly claim on this account should be its meed; but, disdaining as it did to minister directly to any art or utility of life, it sowed the seeds of its own decay and encompassed its own dissolution. It lived in thoughts and words, but not in deeds. How different has been the tendency of modern science, electricity in the nineteenth century can testify, by pointing to a civilization enriched and exalted by telegraphy, telephony, electric illumination, and transmission of power. Much of the best scientific work of the century has been accomplished directly for the ultimate purpose of turning the results to practical advantage, and never yet has more zeal, enterprise, and organized endeavor been directed toward reclaiming territory from the vast unknown than in the age for which we live.

Looking backward, from the standpoint of a civilization that may indeed be meager and insignificant compared with that which the distant future may evolve, yet how proudly may the course of humanity be scanned! Not by undisputed heritage of the race, but by the unceasing efforts of its workers, not by inert intuition, but by the slow and wavering footsteps of the blindfold toward the light, has every step in that ascent been won. The only claim that humanity can offer to praise and admiration is in the fact that its every acquisition has been gained by effort at the cost of some indulgence foregone. Each new attainment has involved new endeavors and created new responsibilities, while the ties uniting men are such that none can be elevated without in some degree advancing all.

Before the days of telegraphy men far apart communicated at the speed of material transmissions; but now, wherever the wires spread, they are within hail at a speed above that of the swiftest meteor. How continuous and effective must have been the stimulus and incentive to mutual activity that even this consciousness must have kept before the mind! The electrical distribution of light and power have given and are now creating a nobler and more elevated condition of the race. These arts are essentially triumphs over difficulties. Each step of their advancement widens the gulf between this era and the prehistoric times of cave dwellers and primitive men. These facilities are secured at the expense of a more extended education, for every new mastery over Nature gives man more power, more dignity, and more nobility. For example, the class of men that, under the *régime* a decade past, took the duties of driving street cars, was composed of individuals whose capacities on the average did not necessarily exceed such as were needed for the control of a horse's intelligence, and the proper application of its strength to the requirements of the traveling public. So soon as the horse is emancipated by electric traction, the driver of a car finds himself in control of a power far in excess of that which two horses would exert—a power never capricious or willful, but absolutely unvarying in its performance. The responsibility devolving upon him has increased, for, by neglect, the power he wields may be the means of destroying life. The control and operation of the motor demands more activity of thought and skill in action. Properly to discharge his duties, the man must rise to their requirements, and the average of the class becomes distinctly higher.

As to the dangers attendant upon the employment of electrical energy little need be said. All agencies for developing a great amount of force necessarily imply corresponding dangers. The danger from electrical energy is perhaps less than from the corresponding power in compressed air, in steam, in water, or in explosives. A strong current is in itself harmless. Its excess can only make the conductors hot. A high electrical pressure is dangerous to life, for the reason that such pressures can force through the resisting substances of the body a sufficiently strong current to damage or destroy them. Perhaps, because of the remarkable fact that the living body is incased by Nature in an integument whose outer shell, the epithelium, is dead, the dry skin is a very bad conductor, but when thoroughly wet its resistance considerably diminishes. A man coming into contact with a dangerous

electrical pressure over small areas of dry skin—as, for instance, when he touches bare copper wires at one thousand volts difference of pressure, with the knuckles of each hand—might receive only a severe shock, when if he had his hands in jars of salt water, and with the same pressure electrically connected between those jars, he might be instantly killed. In the one case the resistance of his body plus that of the skin over the knuckles in contact with the wires might, during the momentary contact, be eighty thousand ohms, and he would then receive only the one eightieth part of one ampère. In the other case, the resistance of his body through the arms, and including the larger area of wetted skin, might be say one thousand ohms, allowing a current of one ampère to pass through him. Under unusual conditions of contact or vitality, pressures of five hundred volts are stated to have killed men, while under ordinary circumstances shocks without any severe injury from five hundred volts are common. On the other hand, a pressure of two thousand volts is commonly fatal, and yet under favorable conditions, individuals have received severe shocks from such pressures without loss of life. Whenever danger exists from high electrical pressures, a little precaution will avert accident. A man who should unguardedly try to extricate some victim from contact with a fallen wire maintained at a high electrical pressure, might jeopardize his own person. If, in the absence of rubber gloves, he should lay hold of the sufferer through the folds of a dry coat or thick cloth, he could perform the task safely. Most nonmetallic substances are nonconductors provided that they are dry, and an ordinary walking stick, skillfully used, is a match for a "live" wire. Again, a man standing on a dry wooden platform, with one hand in his pocket, can handle any single conductor in turn with the other hand, and is secure from all electric danger short of lightning. A charge of ten thousand volts can not hurt him until, with head, foot, or the reserved hand, he comes into the vicinity of some second conducting substance. In other words, an electrical charge is harmless, but a current through the body in sufficient strength is fraught with danger. To be suspended in air from a "live" wire is to occupy an unenviable but yet in itself a safe position; but while so suspended, to reach one foot to the ground might mean instant death.

The application of electricity in the State of New York to the infliction of the death penalty has been an advance in civilization wherein New York has led the world. The self-appointed duty of the people to destroy the life of any criminal is revolting, but

so long as the painful necessity of such tasks remains, it is fit that the death should be inflicted with humanity and dignity. The swift and painless destruction which electricity is now conceded to effect, contrasts most favorably with the older methods of execution.

Concerning the future of electrical invention, who shall speak? We are, however, justified in the belief that the progress which has been maintained in the past will continue unchecked and extend its beneficent influences upon the destinies of our race in the times that are yet to come. We may expect in the early future to see electricity become the great distributing agent, for what power should be more fittingly the messenger than that to which time and distance are of so little moment? But as knowledge advances, it may be that those characteristic forms in which we are now accustomed to regard the development of activity—gravitation, heat, electricity, magnetism, and chemical affinity—may lose their identity, and become merged into one broad science of energy, whose definition shall be the modes of motion of matter, and whose varied aspects shall be these forms that now call for separate classification and treatment. Even now the suggestions of this concentration are casting their shadows before us. Heat is accepted as such a mode of motion. Within the last few decades abundant evidence has been collected to show that the mechanism by which light advances in space is that by which electro-magnetic influences are also transmitted, with the deduction that if we could produce purely electro-magnetic impulses fast enough—if, for instance, we could magnetize and demagnetize an iron rod at a rate equal to that at which the vibrations of light are executed, the rod would shine before our eyes.

The very great sum of human knowledge and human power, as we look back, dwindles into insignificance indeed when we see how little knowledge we still possess of Nature's laws, or how little we can yet control them. We know not why a stone falls to the ground, however thoroughly the conditions regulating the action of gravitation have been investigated. We can not dispel the rain-cloud or divert the approaching storm; but if the imminence of potencies yet uncontrolled represses boastfulness, yet surely the recollection of what electricity alone has done in subjugating our environment should dispel fear, and we need feel no apprehension at the magnitude of the tasks before us.

RAILROAD CONSTRUCTION AND EQUIPMENT.

"On the 4th of July, 1828, Charles Carroll, last surviving signer of the Declaration of Independence, laid the first rail of the Baltimore and Ohio Railroad. One man's life formed the connecting link between the political revolution of the last century and the industrial revolution of the present. The second reaches wider and deeper than the first; yet there are few who realize its full importance or who seriously try to understand it."* In 1830 there were twenty-three miles of railroad in operation in the United States; at the end of 1891 there were 170,601 miles. This was nearly half of the railroads in the whole world.†

It is the purpose of the writer of this article to deal chiefly with the physical features of the vast railroad system built up in the United States in sixty years. But to understand wherein those features are characteristic, and why they have been developed, one must know a few simple economic facts. The stupendous social revolution which the use of steam locomotives has brought about has been accomplished within the span of a single life. Men now living and still vigorous were active lads when the railroad system of the world was begun. In this short time the people of the United States have built not only nearly half the railroads of the world, but they have built far more railroads in proportion to the people than any other great nation; they have secured the cheapest freight rates in the world, and the cheapest average passenger rates among the great civilized nations. They have the fastest passenger trains, and, except England, more fast passenger trains than any other nation, and without exception finer ones. The following little table will show how we compare with other countries in our supply of railroads. It shows the number of square miles of territory, and the number of people, *for each mile of railroad.*

Country.	Square miles.	People.
United States	17.41	367
United Kingdom	6.07	1,885
Germany	8.03	1,901
France	9.72	1,826
Belgium	4.06	2,172
Austria-Hungary	14.42	2,469
Russia in Europe	110.90	5,397

* Prof. A. T. Hadley, Railroad Transportation: Its History and its Laws.

† This figure is from Poor's Manual, and is for December 31, 1891. The Interstate Commerce Commission takes June 30 as the end of the year, and returns 168,403 miles.

It will be seen that we have more than five times as many railroads per head as the English, and almost six times as many as the Belgians. Here we begin to get a glimpse of the great controlling elements—vast areas and a sparse population.

It is difficult to compare our freight rates with those of other countries, or with those of many years ago in our own country, for accurate statistics are not usually to be had, and when they are, they often do not represent the same service in two countries or two periods. Probably the average freight rate in the United States is about one fourth what it was twenty-five years ago; certainly it is but seventy-five per cent of what it was ten years ago. In 1891 it was but 0.929 cent per ton-mile, and if the rate of 1882 had been paid on the traffic carried in 1891, it would have added $250,000,000 to the tax imposed by the carriers. The ton-mile rate in England is estimated by the best judges at two and a half cents, which is 2.69 times our own rate. Had all the freight traffic of the United States in 1891 been done at that rate, the additional tax to producers and consumers would have been about $1,276,000,000. As has been intimated above, however, this statement is more striking than fair, for the English average freight charge pays for a different kind of service and for more service than is given for the ton-mile charge of the United States. But these figures are near enough to the truth to give a very just notion of some of the peculiar advantages which the people of the United States have in their railroads. There are still others besides the great and obvious ones. For many years the railroads were the best and almost the only school of engineering in the country, and they were useful beyond any other calling in training administrators; thus their influence on the intellectual life of the nation has been great. And beyond all this lies the greater fact that they have given to the poor of the whole world new opportunities for comfort, prosperity, and happiness such as the human race never saw before.

The railroads of the United States differ from those of the rest of the world chiefly because of the conditions under which they were built. They began almost with the nation and grew up with it, absolutely without precedent and practically without restriction. Any one could build a railroad anywhere if he could raise the money; and a railroad once built could be operated by its owners according to their notions of public and private policy. A special charter or authority to build under the general railroad law of a State has always been simply and cheaply obtained; and

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Railroad bridge across the Hudson at Poughkeepsie.

while disastrous paralleling of lines has sometimes resulted, and the routes sometimes selected have not been such as to serve the public best, still this freedom has on the whole worked greatly to the public gain. In England, for instance, the one item of "parliamentary expenses" has reached the colossal figure of $10,000 for each mile of railroad built. That is a sum equal to at least one sixth of the entire cost of an average mile of railroad in the United States; and if promoters and builders had been handicapped by such a preliminary charge, our mileage would certainly be much less than it is. So all the way through, while those who built railroads in other countries have been hampered and taxed by legal requirements as to the condition of road and rolling stock, and as to safety appliances, and by the exacting theories of engineers and the public as to the requirements of safety and stability, the American builder has had to consult no one's notions; when he thought it safe to run his own rolling stock over his own tracks he opened his road and asked for patronage. If he killed a man or destroyed his property, he was liable under the common law, but there the attempt to control him ended. It is partly because of this freedom, and partly from other circumstances which will be mentioned later, that the cost of the railroads of the United States has been about $60,000 * a mile, and that of the railroads of England about $217,000.

The owners of railroads have been left free to build and equip their property where and how they pleased, and they have also been left free, generally speaking, to fix rates and classify freight; to fix the speed and frequency of trains, and, in short, to use their property about as they chose. The results of this freedom have been the maximum of public accommodation and the minimum of rates. Every effort to control railroad operation by State laws has been followed by a more or less prompt diminution of the capital offered for investment in new roads, and a more or less obvious restriction of the service done. This is not to say that all

* This figure includes capital stock, bonded debt, and floating debt for the United States railroads. Of course, that is only an approximate measure of the actual cost, but it is the best that we can get. The statistician of the Interstate Commerce Commission makes this total debt $60,340. Mr. S. Wright Dunning, one of the ablest and most thorough students of railroad economics in this or any other country, reduces the Commission estimate to $48,463 per mile, by subtracting those securities owned by the railroad companies which really do not represent railroad property. The "cost" figure for the railroads of the United Kingdom is also paid-up capital, "shares and loans." The average cost of the Continental railroads is much less than that of the English, but easily twice that of the United States railroads.

attempts at State control have done more harm than good, or have been futile; but that, summing them all up, the balance is on the wrong side. Probably the net result of the National Interstate Commerce Act, which went into effect in 1887, will be the same; but fortunately the interpretation and execution of that law fell from the first into the hands of wise and judicious men, and it has so far done less harm than it might have done, and more good than many well-informed men supposed it would do.

We have stated broadly the moral conditions under which the United States railroads grew up. The physical conditions were not less peculiar and important. There was a continent to be occupied. Vast areas were uninhabited and even unexplored. There were numerous deep and broad rivers to cross. The Atlantic States were separated from the great basin of the Mississippi by formidable mountain ranges, and to the west of that basin lay the Rocky Mountains. The great distances to be traversed and the sparse population necessitated economy; the demands of a singularly enterprising people induced speed, and the great physical obstacles required boldness and fertility.

The differentiation of American practice began with the surveys. Accurate maps were not often to be had, and the surveys were frequently original explorations. Instruments and methods were invented, and a special class of railroad surveyors was evolved—men of energy and hardihood, with a keen eye for topography. The chief of the party went into the field with nothing but the general direction to guide him, rode or tramped ahead of his party, picked out the route, settled the maximum grade as he went, and was rapidly followed by the instrument men. He has left on record some astonishing feats of speed in surveys. Perhaps the greatest for one day's work, by one party, is twenty-two miles of "preliminary" line, run with transit, chained, and levels taken at each one hundred feet. This was on the Union Pacific. The low value of land and the urgent desire of the people for railroads left the engineer great latitude in location. He crossed highways and other people's railroads at grade, and ran his lines through the main streets of towns. He learned early to use grades and curves freely where that was the best way out of his difficulties; but he learned also the value of very careful study before final location; so the preliminary studies of the American locating engineers have become noted for their skill and thoroughness among European engineers who are competent to judge of them.

While we have on our mountain lines some of the heaviest grades in the world, it is probably not true that the main lines of railroad in the United States have more grades per mile, or as a rule heavier ones, than those of Great Britain and the Continent. The Baltimore and Ohio crosses the Alleghanies with a maximum grade of 116 feet per mile, and the Pennsylvania with 95 feet. The Chesapeake and Ohio, which originally had a maximum grade of 80 feet per mile, has reduced it lately to 60. Much heavier grades were operated provisionally on these lines during construction. After the Alleghanies are passed we find it common to keep the maximum down to 60 feet, although there are many roads, particularly in the Southern States, with maxima of 70 feet. There are some fortunate lines which are able to keep below 40 feet. In the Rocky Mountains and the Sierras, of course, there must be heavy grades. The Denver and Rio Grande, for instance, works up to 211 feet, and has a mine branch with nearly 406 feet per mile. The Northern Pacific and the Southern Pacific both work, regularly, grades of 116 feet. In 1887 and 1888 the Northern Pacific worked a switchback railroad over the summit of the Cascade Range during the construction of the Stampede Tunnel. On this temporary railroad a regular and heavy traffic was carried over grades of 297 feet per mile and curves of 380 feet radius.

The maximum grade of the St. Gothard Railroad is 142.5 feet per mile, and of the Brenner 132, while the Oroya Railroad in Peru has a maximum grade of 211.2 feet. The London and Northwestern, the greatest of the British railroads, which may be taken as typical, has 150-foot grades in Wales, and 70-foot on its main line.

There is no mechanical reason, except their adhesion weight, why American locomotives should do more efficient or more economical work on grades than any other locomotives, but there is a very great reason why American locomotives and cars should give better service on curves than any others; hence American locating engineers have felt at liberty to use curves more freely than those of other countries. It is impossible to separate cause and effect, or to say that the curves are the result of the rolling stock or that the rolling stock is the result of the curves ; the two have been developed together. The free use of curves of short radius has been one of the great elements in the bold and rapid and economical construction of the railroads of the country. Taking again the great lines across the Alleghanies, we find that

the Baltimore and Ohio uses a minimum radius of 600 feet for its curves. The Pennsylvania has a minimum radius of 715.2 feet. The Erie has set its sharpest curvature at 950.76 feet radius. The minimum of the New York Central is the same as that of the Pennsylvania. The Chesapeake and Ohio gets through the Alleghanies with rather light curvature but a great deal of it—for instance, down the valley of the New River, for 51 miles, sixty-three per cent of the line is on curves. On the Central and Union Pacific roads the sharpest curves are 541.35 feet radius. It would be quite impossible to say what the average practice is for the railroads of the country, but they have, as a rule, probably restricted themselves to curves of not less than 715 feet radius. Taking the London and Northwestern again as a typical English line, we find on the main line no curves of less than 1,320 feet radius, and very little curvature so sharp as this. On the Welsh lines there are many curves of somewhat shorter radius.

In special cases very much sharper curves are used on American lines than any of those mentioned above. In the Rocky Mountains some magnificent examples are to be found of the economical use of heavy curves. There are in operation there, carrying regular and heavy traffic, railroads which could never have been built had the engineers confined themselves to the standards of European construction, or, in fact, to those of the Eastern United States. On the Elevated Railroad of New York curves of 90 feet radius are used, but although the track is of standard gauge, the conditions are otherwise exceptional. The locomotive wheel base is short; the draw bars are attached to the trucks instead of to the body of the cars, and speed is low.

The time element becomes more important in construction than in the period of survey, for when building begins the interest account begins; and as the rate of interest has until lately been very high in the United States, this has been a special incentive to speed in construction. Possibly the national habit of putting one's utmost energy into whatever he has to do has been quite as important an element in developing rapid methods of building railroads as the necessity for economy; but however that may be, we have our own peculiar methods of grading and laying track. The fertile American inventor has tried to apply machinery to this work, but with rather indifferent success, although grading and track-laying machines are sometimes used; but the greatest triumphs have been obtained by the use of men and horses and plows and scrapers, and by skillful organization. It has come to

be no unusual thing to grade and lay track at the rate of two miles a day. A remarkable feat of sustained speed was accomplished on the Great Northern—then the St. Paul, Minneapolis and Manitoba—Railroad in 1887, where 643 miles of railroad was laid between April 2d and November 18th. The grading was done at the rate of from five to six miles per day. Of course, it is understood that the track was laid consecutively from one end; it was a fine instance of skillful organization and energetic work. The ties, rails, and other materials were brought to the front over the track already laid as they were needed. There is a record of six miles of track laid on the Canadian Pacific in fourteen hours in 1883. On the Union Pacific seven miles of track was laid in seven and a quarter hours, and on the Central Pacific ten miles in twelve hours. Toward the end of the construction of the Union Pacific, 535 miles of track was laid in one year and twenty days. This was westward from the summit of the Rocky Mountains, and included the heaviest work done on the road.

The exigencies of speed and economy, the abundance of timber, and the scarcity of iron and steel, determined from the outset the character of the permanent way of American railroads. Where timber was so plentiful and axemen so extremely skillful it was cheaper to cross ravines on trestles than to fill them with earth or span them with stone arches; indeed, the legs of the timber trestles have been exceedingly important in the march of civilization across the continent. But for their use many miles of roads now existing would never have been built, or their construction would have been delayed for years. In the use of these trestles American engineers early developed great skill and boldness, and some of their work has become classical, as, for instance, the Portage Viaduct on the Erie, which was a timber structure over 800 feet long, with an extreme height of 243 feet above the bottom of the ravine. This was the most remarkable timber viaduct ever built. It was constructed in a year and a month, and contained 1,602,000 feet, board measure, of timber. After twenty-three years' use it was completely destroyed by fire, and exactly two and a half months later a new iron viaduct was completed and opened for traffic in its place. Another fine example of the bold use of wood for bridging was the Dale Creek trestle on the Union Pacific, near the summit of the Rocky Mountains. This was 520 feet long and 113 feet high; it has also been rebuilt in iron. Probably the longest wooden trestle in the world crosses Lake Pontchartrain near New Orleans; it is twenty-two miles long.

The total length of trestle bridges in the United States can only be estimated. In 1889, when there were 160,000 miles of main-line track in the United States, Mr. Theodore Cooper, C. E., concluded from very careful investigation that there were 3,030 miles of railroad bridges and trestles, of which he estimates that 2,407 miles were trestles and wooden spans under twenty feet long. Many of the trestles which were built at first to save time or money, or both, have been filled in with earth, and work of this kind is going on steadily all over the United States. Mr. Cooper's estimate was, that out of 2,400 miles mentioned above, at least one fourth would be replaced by earthen embankment, and at least 1,000 miles more would be replaced by iron structures, leaving 800 miles to be maintained in wood.

The same conditions of abundance of timber and scarcity of metal affected the character of the track itself as compared with English and Continental railroads. The railroads of the United States are laid with lighter rails, with no metal chairs to support them, but with more cross-ties in a given length than in Europe. Thus, while the standard track of the London and Northwestern has rails weighing ninety pounds to the yard laid in cast-iron chairs, each of which weighs forty-four pounds, on ties spaced three feet apart, the standard of the Pennsylvania railroad is a rail eighty-five pounds to the yard, laid directly on ties spaced twenty-two inches apart. The London and Northwestern chairs are fastened to the ties by screw-bolts, while the Pennsylvania rails are simply spiked by plain spikes; it would be hard to say which of these standards is safer, smoother, or more durable; each is thoroughly good of its kind.

The many large and swift streams which our railroads had to cross, together with the other conditions which we have mentioned, developed one of the most important and characteristic products of the American methods—that is, the American railroad bridge. For years, while the Englishmen were crossing streams with stone arches or short cast-iron spans, the Americans used wooden trusses. The Howe truss, which was patented in 1840, was for a long time the standard American railroad bridge, but the limit of that structure was long ago reached. For spans above 150 feet iron bridges are now actually cheaper in first cost, and of course safer from destruction by fire and far more durable. Very few Howe trusses are now built except on those lines which are not only new but poor. The long-span iron railroad bridge began in America with the building of the Ohio River

bridge at Steubenville in 1863 and 1864 by Mr. J. H. Linville. The channel span of this bridge is 320 feet long. Before this time the peculiarly American type of iron bridge had been developed in shorter spans—that is, what is known as a pin-connected bridge, in which the tension members are forged eye-bars and the posts of wrought iron; in later structures all these parts are steel. The eye-bars, posts, and parts which make the top and bottom cords are connected by turned iron pins, by which the strains are carried from one part to another. The typical English and European bridge, on the other hand, is the lattice, which is built up of oblique members, intersecting each other at many points and all riveted together to form one stiff girder. Lattice bridges are somewhat used in this country, but have never found much favor. The great advantages of the American type are that the metal is concentrated in few pieces, the strains can be accurately determined and each member carefully proportioned for the work which it has to do, and the weight of metal reduced to the minimum; that all parts are accessible for inspection and painting; and that everything can be finished in the shops and the parts assembled in the field quickly and without much labor. The riveting to be done at the time of erecting the bridge in the field is trifling compared with that which must be done on an English bridge. It will be seen that here also the great underlying principle of economy of time and work has controlled in the evolution of the type.

A remarkable instance of the speed with which the American bridge can be erected occurred in the building of the Cairo bridge of the Illinois Central Railroad over the Ohio River. The two channel spans of that bridge are each 518 feet and 6 inches long. The trusses are 61 feet deep and stand 25 feet apart. The total weight of each span is 2,055,200 pounds. One of these spans was erected in six days. The false work on which the span was built was then taken down, the piles were drawn and redriven for the second span; the false work again erected on the piles, and the second span built. The whole time used in erecting the two great spans and moving the false works was one month and three days, and this time included five days lost in waiting for the completion of certain masonry. This is the quickest time in bridge-building of which there is any record. The speed element in bridge-building is a very important one in more than one way. When a bridge costs $500,000 or, as in some cases, $3,000,000 it is important to save interest; but it is also

highly important to reduce to the shortest time the period during which the work is exposed to danger from sudden floods, ice jams, or passing craft.

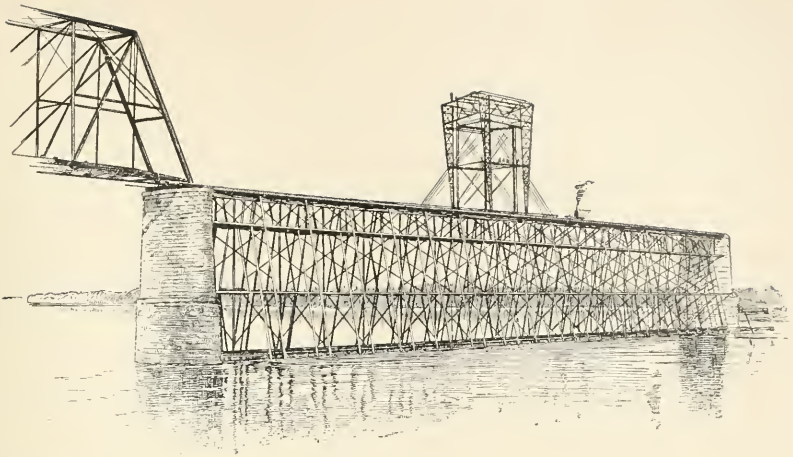
While the Forth bridge has the longest trussed span yet erected, America is still pre-eminent in the number and size of its metal railroad bridges. Mr. Cooper's figures, collected in 1889, gave over five miles of bridges with spans from 300 to 400 feet long, four miles with spans from 400 to 500 feet, and two miles and a half with spans exceeding 500 feet; all exclusive of suspension bridges. But since these figures were collected several very important bridges have been built which would add materially to these lengths; as, for instance, the Memphis bridge over the Mississippi River, which was opened in June, 1892, and which has one span of 790 feet and two of 621 feet each, and the Colorado bridge, which has one span of 660 feet.

Much the largest drawbridges in the world have been built in the United States, culminating with that at New London, Conn., which has a swinging span of 503 feet. That over the Arthur Kill is 500 feet long, and there are at least seven with spans of over 400 feet.

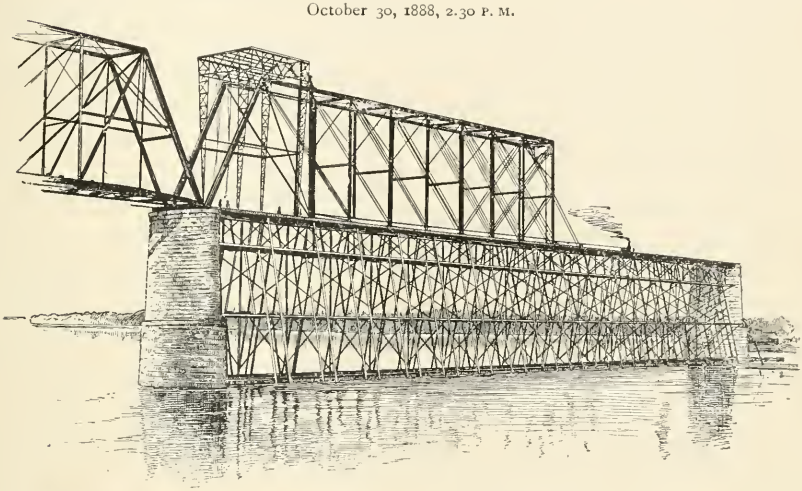
Spanning our great rivers by these numerous bridges has naturally carried to high perfection the methods of executing deep and difficult foundations. The deepest foundations sunk by the pneumatic method are those of the Memphis bridge, 131 feet, and the Eads bridge at St. Louis, 135 feet 5 inches. The deepest foundations ever sunk by open dredging are the Dufferin bridge, Benares, India, 190 feet; the Hawkesbury bridge, New South Wales, 160 feet; and the Poughkeepsie, 135 feet. The Hawkesbury bridge was built entirely by American contractors and engineers.

The cheapness of land and the constant necessity for strict economy have developed some peculiarities in American railroad stations and yards, although these are not so characteristic as some other features. Perhaps what would strike a foreigner with greatest force is the strictly utilitarian character of our railroad buildings and the lamentable want of taste in their architecture outside of the cities. Great improvement in this respect has been made in recent years, but the typical American country station is generally unattractive and sometimes positively squalid.

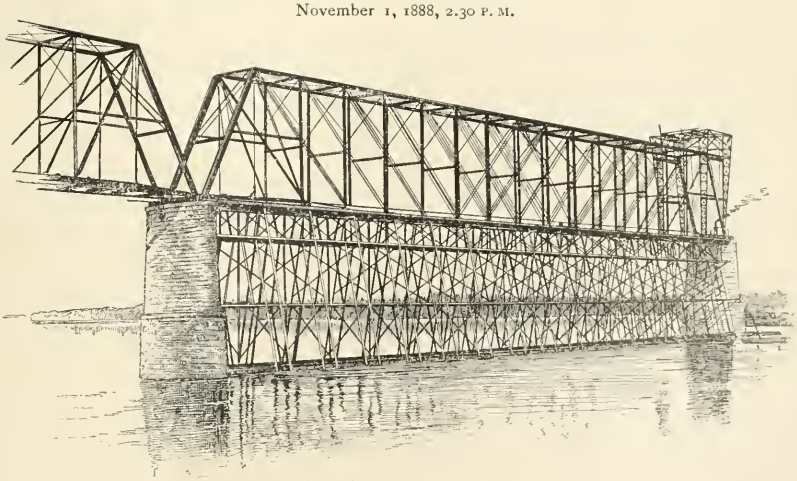
In what was said about the use of curves the interdependence of track and rolling stock has been mentioned. The American locomotive differs from the English and Continental locomotive



October 30, 1888, 2.30 P. M.



November 1, 1888, 2.30 P. M.



November 3, 1888, 2.30 P. M.

RAPID BRIDGE CONSTRUCTION.—Railroad Bridge across the Ohio River at Cairo, Ill.

in its flexibility and elasticity as well as in its greater weight, and also in several minor details. It would be too much to say that it was evolved by the necessity for finding its way around sharp curves and over rough track. Considerations of efficiency and economical working and of low cost of maintenance and repairs have all acted to create the type.

The American engineers were the first to put their locomotives on equalizing levers, by which the weight is admirably distributed over the different wheels; and this equalization, with the use of adequate springs, makes the most elastic and easiest riding locomotive in the world. The swinging truck under the forward end of the engine is also an American device. It was introduced by Mr. John B. Jervis in a locomotive built in 1832 at the West Point Foundry Works for the Mohawk and Hudson Railroad. This feature long ago became universal in American practice. The multiplication of coupled driving-wheels, by which great weight may be used for adhesion without dangerous concentration on a single pair of wheels, has been carried to a greater extent in the United States than elsewhere, and to-day the typical heavy, freight locomotive may be said to be the "consolidation," with eight driving-wheels coupled and a two-wheel swinging truck forward; although the ten-wheel engine, with six drivers coupled and a four-wheel truck, and the "Mogul," with six drivers and a two-wheel truck, are perhaps even more used than the "consolidation." The extreme development of freight locomotives for very heavy work is found in the decapod, with ten drivers coupled and a two-wheel truck, and in the twelve-wheel locomotive, with eight drivers coupled and a four-wheel truck. The standard passenger engine still remains the eight-wheeler, or, as it is often called, the "American," with four drivers coupled and a four-wheel truck; but the ten-wheeler has become very popular for heavy express passenger service.

The little table on the next page shows the weights of standard locomotives used in the United States, in England, and in France.

The greater weight of the American locomotive in both passenger and freight service has come about purely from considerations of economy and efficiency. As was pointed out at the beginning of this article, the rates for transportation of freight in the United States have fallen under the intense competition, until they are but thirty-seven per cent of the average rates received in England. At the same time wages, fuel, iron, and steel, the

Country and Class.	Weight on drivers.	Total weight.
Freight Engines.	*Pounds.*	*Pounds.*
Philadelphia and Reading, consolidation	148,000	164,000
Chesapeake and Ohio, decapod	128,000	144,000
New York Central, consolidation	114,000	128,000
Pennsylvania Railroad, consolidation	100,600	114,625
Burlington and Missouri River, decapod	150,300	No truck.
St. Clair Tunnel, tank decapod	195,000	No truck.
London and Northwestern, tank	64,736	113,120
London and Northwestern, six-wheeler	76,160	No truck.
Passenger Engines.		
Baltimore and Ohio, ten-wheeler	103,300	133,000
Erie, ten-wheeler	100,000	130,000
Michigan Central, ten-wheeler	99,000	135,000
Central of New Jersey, eight-wheeler	81,000	110,000
New York Central, eight-wheeler	80,000	120,000
Pennsylvania Railroad, eight-wheeler	61,500	98,400
London and Northwestern, heaviest compound	69,440	101,920
London and Northwestern, four-wheel express	47,488	70,336
London and Northwestern, "Lady of the Lake" class, one pair of drivers	25,760	61,040
French, four-coupled	59,000 to 61,600	.....

great elements of expense, have remained high in this country. The result has been that to-day the total railroad capital, including stock, funded debt, and floating debt, in the United States receives but 3.06 per cent interest payment, while the dividend on stock amounts to but 1.85. In the face of these small returns the reduction of rates continues from year to year. The engineers and operating officers of the American railroads early realized the necessity for the strictest economy in transportation of freight, from which two thirds of the total earnings is drawn; and the most obvious economy was in increasing train loads. It takes no larger train crew to handle a large train than to handle a small one. Practically as many large trains can be moved over a given track as small ones; and in various ways the increase of average train loads reduces expenses. Thus the weight and power of American locomotives have, by a natural process of evolution, increased year by year. There are still other reasons for using engines of great power. Our train journeys are frequently very long, and the same train runs through several degrees of latitude or longitude, and meets many changes of weather in one trip. It is necessary, therefore, especially in winter, to have engines which can haul a train and keep to the schedule time against opposing winds, on wet and slippery rails, and through snowstorms and blizzards. Furthermore, passenger journeys of from forty-eight hours to four or five days are very common, and it has become

necessary to make passenger trains hotels on wheels, which adds greatly to their weight. It has long been the fashion to say that the English average rates could be reduced if English railroad managers would use the heavy American engine and the long and heavy American cars. Probably this assumption is false, for the conditions of traffic in England are entirely different from those in America. In each country the rolling stock and the methods of using it have been developed according to the needs and tastes of the users.

The minor peculiarities of the American engine must be passed over, but a very characteristic one is the comfortable cab for the protection of the engine-man and the fireman. This also has grown out of the exigencies of a continental climate. Many Englishmen insist that it is an error to make the engine-man comfortable, for, they say, he will get lazy and dull and relax his vigilance if he has a soft seat in a warm and sheltered place; so the English driver stands on the open foot-board with practically no shelter from the weather. It would probably be better policy to give him a cushioned arm-chair so comfortable that every muscle would be at rest, and to keep him in a sheltered apartment with a mild and uniform temperature; then his mental and physical energies could all be centered on his exacting duties. Every discomfort that he has to endure distracts his faculties and diminishes his power to a greater or less degree. If this reasoning is correct, the American locomotive cab is not only a humane but a profitable institution.

The first great differentiation in the American railroad car was the use of a long body on two swinging trucks. The standard English and Continental car, as is well known, has two or three axles, the position of which, as regards the body of the car, is fixed. The standard American has four axles arranged in pairs, each pair free to swing to any angle relatively to the body of the car. We have said that the swinging truck was first applied to locomotive engines by John B. Jervis in 1832. The principle was first practically applied to the cars of a steam railroad by Ross Winans, on the Baltimore and Ohio, in 1833. He failed to get a patent, but the world really owes to him this great improvement. This device has made it possible to run the long, commodious, capacious, and easy-riding freight and passenger car so characteristic of the American railroad, and it is gradually finding its way into use abroad; but the prejudice against it which has long existed is indicated by the English nickname "bogie."

The open passenger car, with central aisle and end doors, giving free communication from end to end of the train for passengers and trainmen, has long been distinctively American, and it is a fashion which has such immense advantages that it is sure to be adopted sooner or later throughout the world. For several years cars with central or side aisles and end doors have been coming into use in Europe. The sleeping and dining cars, which have long ago become indispensable, are peculiarly American also, and they, too, are finding their way abroad. It is easy to see how these were evolved out of the American conditions—the length of the common journey made them necessary.

One of the great economies in American railroading which has made possible the rapid growth of the system and the low rates has been in the use of cast-iron car wheels. These are universal in freight service and very common in passenger service. Their average cost to-day is probably about seven and a half dollars, against forty dollars for wrought-iron wheels with steel tire. As there are pretty nearly ten million wheels in service in the United States, the difference of thirty-two dollars and a half a wheel amounts to $32,500,000 in first cost in this one item. It is often said that the cast-iron wheel is not safe; but, in the first place, if honestly made and bought under proper tests and specifications, it is practically safe; and, in the second place, there is such a thing as paying too much money for safety. In this, as in all other human affairs, we must take the sum of the advantages and disadvantages.

One of the most important elements of "speed, safety, and economy" in railroad operation was introduced with the air brake, which had its origin and its first application on the railroads of the United States, and has reached there its highest development. It appears to be true that the first patents for vacuum brakes were taken out in 1860, in France, by MM. du Tremblay and Martin, and that even earlier than that English inventors had conceived of the use of compressed air brakes; but it was Mr. George Westinghouse, Jr., of Schenectady, N. Y., who invented and designed the first actual, workable air brake, and it was first put into practical use on one of the Pennsylvania Railroad lines in 1869. Since then this greatest of all the safety appliances has undergone many improvements, most of which have been planned in Mr. Westinghouse's fertile brain, and have been tried and developed on the United States railroads.

The American method of moving trains and of protecting

them is peculiar to the country. Out of a total of one hundred and seventy thousand miles of railroad, there are but about three thousand miles protected by block signals, while in the United Kingdom eighty-three per cent of all the railroads are worked under the block system, and in England itself ninety-eight per cent of the double-track lines are so worked. On the one hundred and sixty-seven thousand miles of railroad in the United States not block-signaled there is a great and often intense traffic moving. Single-track railroads can be found over which sixty and even seventy trains a day are moved. These trains differ in weight, speed, and class. By the universal American system they are constantly watched from one central office on each division, and their movements ordered and controlled by the train-dispatcher's free and constant use of the telegraph. This system gives the maximum flexibility to the movement. If a train is delayed for any reason, it is got out of the way as quickly as possible, and the tide of traffic flows on without interruption. It requires but little consideration to see the immense superiority in economy and efficiency of this system over any effort to move trains by fixed schedules alone. Greater security and equal facility of movement can be had by the use of the block system, but, as we said above, it is possible to pay too much for safety. Had the block system been forced upon the railroads of the United States by law, the development of the railroad system, the reduction of rates, and the general service of the public would all have suffered; but now the time has come when the railroads of heavy traffic will find it actually economical to work under block signals, and they are now able to borrow money at rates so low that they have no good reason for putting off this immense safeguard.

In the mechanical details of block signaling and of interlocking switches and signals, in safety switches, in train signals, and in many other details, the Americans have done original and characteristic work, most of which has the great family traits of simplicity of structure and economy in operation and repairs; but a description of them would lead us too far into technical details. It has seemed necessary to confine this paper to pretty broad and general lines, but it is hoped that from what has been said the reader may get a somewhat comprehensive although perhaps inadequate notion of the most important peculiarities of the railroads of the United States; if he can not, the writer has failed in his purpose.

To sum up very briefly, it may be said that their chief peculiari-

ties are such as come from the principle of holding the individual responsible for the result while leaving him free as to the means. Thus it came about that routine had little to do with their development, but the initiative of original men had a great deal to do with it.

The most important conclusions to be drawn from this brief review of the railroads of our country are, that they are the direct and logical result of a natural process of evolution, and that their rapid growth, singular efficiency, and incomparable service to the world are mainly due to the fact that they are the work of a keen and energetic breed of men who have been unhampered by Government. They are another magnificent example of the broad truth that men do best when they are let alone.

SHOEMAKING.

Of the industries of the nation there is perhaps not one more distinctively American than that of shoemaking, nor one that better illustrates the characteristic energy and industry, the utilitarian directness of business methods, and the close economy of effort, time, and material, impressed upon the people of the United States by the stimulating competition begotten of the freedom bequeathed to us by our forefathers.

The leather itself—a soft, stretchy, spongy material—easily defaced, not easy to cut with any but the keenest tools, with difficulty receiving definite forms, and by no means even either in thickness or texture, presents difficulties not met in dealing with substances of firmer consistency in other arts. There are twenty-six lengths or regular sizes of boots and shoes made in two series, each numbering from one to thirteen, besides intermediate or half sizes in some cases; many of the sizes are made ordinarily in five different widths; and besides this, all the different sizes and widths are made in a great variety of distinct styles. These conditions call for the most painstaking attention on the part of manufacturer, foremen, and workmen, and challenge to the utmost the skill of the inventor and mechanic in producing machines having as nearly as possible universal adaptability; for the buyer has a sharp eye and has become from year to year more critical; and when assembled at random, each shoe of a pair must be like its mate, and each pair in the "case" must be equal to the others in quality and finish.

The growth of American shoemaking, from the handicraft of

the cordwainer to its present position in the front rank of the useful arts, may be divided into three characteristic periods, as follows:

First Period—from 1629 to 1750.

The Cordwainer.

The Mayflower, on her third trip to Plymouth Colony in 1629, brought the first shoemaker, Thomas Beard, to our shores, and with him the material for his work, consisting of "divers hydes both for sole and upp leathers"; he was to have his "dyett and houseroom at the charge of the companie." He afterward settled at Portsmouth, N. H. In 1629 the first tanner, Francis Ingalls, settled in what is now Lynn (then called "Saugust"), in Massachusetts, followed soon after by George Keyser, John Burrill, and later by others, and by the curriers and morocco-makers. Philip Kertland, supposed to be the first shoemaker in Lynn, came over from Buckinghamshire, England, in 1635, and about the same time came Edmund Bridges, who was also a blacksmith; these were followed in 1651 by Henry Silsbee, a man of means and the ancestor of the Silsbees of this country. From this beginning the town became at an early date a pioneer in the business, and has ever since continued to be one of the principal centers of production, especially of women's and misses' shoes.

In these early times the workman often followed his calling in connection with some other pursuit, as did Edmund Bridges already mentioned, and probably Thomas Beard before him; for the latter had allotted to him fifty acres of land, for which he was to "doe service for certain dayes in the yeare." He worked to supply his family and friends, and for the neighbors in his settlement, and perhaps, if he had a reputation for extra fine work, he might have a still wider patronage. Sometimes, in sparsely settled regions, he "packed his kit" and made the circuit of the homes of his customers, to there make the yearly supply for the family, from material obtained by his employers at the nearest tannery, or to make such repairs as were needed.

His tools were few and simple, not differing materially from those used by the progenitors of his craft in ancient Rome or Pompeii. He sat upon a low bench a yard long and half as wide, having at one end a leather-covered seat, and at the other a series of shallow compartments inclosed at the back and ends by a narrow riser, in which were cut notches to hold his cutting, paring, and skiving knives, his three or four awls of various curves for

piercing for his thread, and a rasp or two. The compartments held pots for paste and blacking, pincers for lasting, his hammer, variously formed "shoulder-sticks" for "setting the edges" of heel and sole, and "rub-sticks" for finishing the bottom; the smaller ones held tacks, pegs, wax for his thread, blackball and bayberry wax for polishing, and numerous odds and ends, while underneath was a drawer to hold his thread, patterns, linings, etc. Here he sat by the kitchen fire, or on a pleasant day outside the door, with a "noggin" of water at his feet in which he wet the soles, his lapstone near at hand on which he hammered and molded them; within easy reach were a pair of clamps, formed of two barrel staves or "splits," which held the uppers supported between his knees while he "seamed" or "bound" them; and also the strap, which, passing under his foot, held the sole upon the last, and both upon his knee, while he stitched on the welt or sewed the upper to it. All day long he cut and skived, pulled and tacked, hammered and sewed, scraped and rubbed, to finish a pair of shoes, which to-day could be made, save the time required for drying, in from twenty to thirty minutes by the present improved steam machinery.

As before stated, Lynn was the cradle of the industry, and as early as 1650, the shoemakers of that town supplied the merchants of Boston with shoes for their trade, chiefly of cowhide or calfskin, morocco leather not having been introduced; but the business soon spread to or was indigenous to other places also. Micah Richmond moved from Duxbury to Plymouth in 1630, and was probably the first tanner in that county, followed soon after by a Mr. Cushman at Kingston; and in 1650 Experience Mitchell was tanning at the part of Bridgewater called Joppa (now East Bridgewater). As early as 1648 the shoemakers of the colony were incorporated into a company or guild, with power to regulate their trade for three years; and at the same time a certain Captain Matthews had a tannery on his plantation in Virginia, and employed eight shoemakers upon leather tanned and finished there.

Connecticut in 1656, Rhode Island in 1706, and Pennsylvania in 1721, made the business of the cordwainer the subject of restrictive enactments—in the latter State limiting the price of a pair of good, plain men's shoes to six shillings six pence, and of women's shoes to five shillings. At the time of the occupation of New York by the British in 1664, tanning and shoemaking were firmly established, and had given memorial names to certain

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Passenger locomotive No. 999, New York Central and Hudson River Railroad.

localities; and in 1698 we find these trades carried on in Philadelphia, then in its infancy.

Second Period—from 1750 to 1850.

From a Trade to a Manufacturing Industry.

The hundred years now being considered was, when compared with the rapid development of later times, a period of slow but sure transition. In it the bench was transferred from the dwelling to the more roomy shop near by, having "berths" for journeymen and "boys on the seam"; the division of labor was instituted—the journeymen on special work heralding the special machine operator of a later day; manual labor in some departments yielded to labor-saving machines of simple structure, precursors of those better constructed and more complex yet to come; and in the end the shop gave place to the factory, and the trade became the organized manufacture.

There were doubtless at the beginning of the period a few shops already existing, especially in those places known to have been a little later centers of production, as in the case of Captain Matthews, of Virginia. In this as in other industries the men of energy and business ability no doubt soon took the lead and dominated those deficient in those qualities. At the time when John Adams Dagyr, a Welshman, came to Lynn in 1750, William Gray, John Mansfield, and Benjamin Newhall were the only "bosses" who employed journeymen and apprentices in that town.

The business gradually extended through the eastern counties of the State, and the number of shops increased, until at the beginning of the present century there were not far from eight hundred shops in Massachusetts, there being in Lynn and its vicinity alone not less than four or five hundred. These generally accommodated the "boss" and two or three journeymen and a boy each, and together could put out a million and a quarter pairs annually, worth about eighty-seven and a half cents to a dollar a pair. The other shoemaking States probably made nearly or quite as many more.

Early in the century the shops began to assume larger proportions—forty or fifty feet long and two stories high—and shoes were sent out to be made in neighboring towns, and eventually to more distant towns, and to other States. The stock was cut, assorted, and made into lots in the home shop, which introduced

the first step in the division of labor—the cutting department; the binding and closing of the uppers was another step, and thus the process was subdivided into "cutting," "binding," and "bottoming." As time passed, workmen began to devote themselves to, and excel in particular kinds of work—"cacks," or infants' shoes, slippers, welts, pegged work, nailed work, etc., still another step toward a more complete division, as the business became centralized, and the workmen were assembled together in the larger shops toward the end of the period.

The first invention of record in shoe machinery was that of a combined lasting and sole-nailing machine by M. J. Brunel, in 1810, designed to be used in a manufactory for supplying shoes to the British army. It is said to have been an operative machine, and, though inconvenient and slow, it was at that time considered satisfactory. There had been before this date five splitting machines, for curriers' use, patented in this country, and also patents granted to Howard in 1800, Bedford in 1806, Montgomery in 1807, and Barnum in 1808, for what may have been either devices or processes—the uncertainty resulting from the loss of the records, drawings, and models of the early inventions by the burning of the Patent Office in December, 1836. Some few of the original patents were returned to the office to be copied, and in 1827 the Journal of the Franklin Institute began to notice and more or less fully describe the patented inventions; from these sources and from the titles of the patents (which, by the way, are far from being trustworthy), and from occasional mention in other publications of the day, we derive all our knowledge of the art in the United States up to that time.

There had been, before the fire, patents issued as follows: Thirteen for splitting machines; eighteen for making (process or device); six for pegged or nailed shoes; four for lasts; fifteen for machines to crimp boot-fronts; five for rolls to harden soles, etc.; three for clamps and pricking devices for hand sewing; seventeen for cutting, three or four of which were for dies, and the remainder probably for patterns or methods; ten for pegging and nailing machines; three for benches; two for lasting tools; four for boot-trees; three for peg-making machines; one each for shoe-holder and channel-knife; three for cementing soles; four for boot-leg turners; five for awl-handles; and one for a lap-skiver. The pioneer patents in the classes named, followed in about the same order in which they have now been mentioned; and for the remainder of the time until 1850 the course of invention continued

in the same lines, with the addition of planes for trimming, and shoulder-sticks or keys for setting the edges of soles, and of racers and skivers for forming heel-rands.

The greater part of these devices were either tools for the hand or simple contrivances to facilitate hand work; a few in several of the classes contained elements used in the successful machines of the present time, and some of them indicated with tolerable certainty to the future inventor or improver the true path to a successful combination of mechanical elements.

Final Period—from 1850 to 1892.

The Steam-Power Factory.

Having traced the infancy and slow-moving germinant period of the art as it advanced toward maturity unaided by machinery, there remains to be considered its rapid culmination when assisted by adequate mechanism; when the able and energetic business manager is seconded by the no less capable and energetic inventor. It would be pleasing to those interested to follow minutely step by step the growth of those machines which are to-day considered essential in the trade, from the first conception of their several elements to their final embodiment in the existing forms; tracing not only those devices which pointed directly on to success, but awarding merited praise to the honest efforts which by trial and failure served as waymarks to warn against failure. But the allotment of space in this paper makes it necessary to touch only the salient points of the subject, and notice only those men and inventions more directly potent in effecting the result.

In the first decade of the period, while invention went steadily on to perfect and make more efficient the lines of machinery already mentioned, a new departure was commencing both in this country and in England. The sewing machines of Howe and of J. M. Singer (patented 1851), with various improvements, began in 1852 to be introduced into American shops for closing and binding uppers with dry thread; the introduction of these machines, and the pegging machines a little later on, together with dieing, sand-papering, and heel-making machines, and the use of steam power in 1857–'58, effected the removal of the workmen to the factories and completely established the factory system. In the meantime the inventors in England were by no means inactive in developing and improving upon the idea of Brunel in lasting and metallic fastening machines, especially in the direction of attaching

soles by screws, either turned in or driven as nails; and in this class of machines and in heel-attaching machines they were in advance of us; these devices, however, though proving their inventors to be fully our equals in grasp of mechanical expedients, lacked the perpetuating quality of utility—no one of them having come into general use. The sewing machine of Singer, on the contrary, surreptitiously patented in that country to E. J. Hughes, in 1852, slowly worked its way into favor and became a standard machine.

Since more than half of all boots and shoes are pegged, and power peggers are the chief instruments in their manufacture, the latter justly rank among the most important of labor-saving machines. They were introduced about the year 1857. The first operatively in use were those of A. T. Gallahue, of Pittsburg, Pa., and S. D. Tripp and William Wells, of Lynn, Mass. They were used for a time, but finally gave place to those of greater efficiency brought out through the efforts of Mr. Elmer Townsend, who had previously been a shoe dealer. Mr. Townsend deserves especial notice for his persistent and liberal policy, which spared neither labor nor expense in perfecting these and other machines; and it is to his agency that the trade is indebted not only for the most rapid pegger yet known, but for the wax-thread sewing machine for thick work, the "cable-wire" nailer for laying and attaching soles, and the pioneer eyeletting machine.

About the year 1857 steam power began to be used in the factories in eastern Massachusetts, and near the same time came the first lasting machine, by William Wells; the pioneer heel-building, sand-papering, and heel and edge burnishing machines, and the splitter for shop use, by Mr. J. A. Safford.

In July, 1858, the first machine for sewing soles to shoes was patented by Mr. Lyman R. Blake, of Abington, Mass.; it made what is known as the "chain stitch" from a single waxed thread, and contained essentially the same stitch-forming devices as those before used by Wickersham and Butterfield. In order to use a barbed needle, which is essential in waxed thread work, it was necessary to present the thread along the insole, and to do this it was passed through a hollow upturned arm, which entered the shoe and contained also the looper; this feature, which has since been called a "horn," constituted the real novelty in the machine. Mr. Blake's chief invention, however, as has been well said by others, was the discovery that a serviceable shoe could be made in this manner. For the shoe and method of making it he received patents in August, 1860.

While the patents were pending the machine was brought to the notice of Colonel Gordon McKay, of Boston, who, with the foresight and just estimate of values which have ever characterized him, readily discerned its possibilities and became its principal owner and manager. From this time Colonel McKay devoted his energies to perfecting the invention, and in August, 1862, had succeeded, by the joint efforts of himself and Mr. R. H. Mathies, in producing a machine which has continued in successful use, and become more and more a necessity to the present time.

The impulse given to shoemaking by the addition of the sewing machine to its list of sole-attachers was undoubtedly the proximate foundation of the present wonderful result. From that time invention, stimulated by the success of that machine, by competition, and by the liberal encouragement offered by its manager to ingenuity, proceeded with unprecedented rapidity not only in perfecting the lines of machinery already commenced, but in new and diverging lines, until at the present time the knife of the stock-cutter has become the only hand implement unchallenged by the competing machine; and even in the cutting room, that sanctuary of hand work, the trained eye of the inventor is now looking for spoils in the way of increased profits from fractional savings.

The progress of invention for the ten years from 1860 to 1870 may be summarily stated as follows: The McKay sole-sewing and turned-shoe machines and the Townsend and Bean wax-thread machines were introduced, and peggers by Sargent, Whittemore, and Stevens were perfected. Machines for nailing soles with wire were made by Sargent, Blake, Libby, and Goddu, and for screwing on soles by Sellier, Lemercier, Cabourg, and others; and various forms of nail wire were invented by Smith, Goddard, Wickersham, and others. The "American" lasting machine, improved from the Wells, and the lasting tacker and pegger of Ingalls and Fisher, came into use; and also the machines of G. W. Ellis and C. W. Glidden, for pricking, breasting, nailing, and trimming heels, which, perfected by Mr. Glidden under the direction of the McKay Heeling Machine Association, became and continue to be the leading machines of their kind.

During the same time there were introduced the power crimping machines, the sole-rounding machine of Stevens, the channel cutter of McKay, Blake, and others, the sole-molding machine of Johnson, the sole-beating machines of Gilmore and Tripp, while initial experiments were being made in rotary heel trimmers, heel

and edge burnishers, and some other minor machines which were perfected at a later date. During this decade also were begun the turned-shoe welt and fair-stitch sewing machine by Daniel Mills and Charles Goodyear, which, consolidated with the McKay turned-shoe machine and developed by the Goodyear and McKay Company, laid the foundation for the very successful line of turned and welt shoe machines now put out by that company.

During the next ten years the "Union" and "National" wax-thread machines, and the "Varney" pegger, were added to the existing list, the lock-stitch wax-thread machines were begun, and the compressed peg strip of Sturtevant was introduced. The "cable-wire" and "standard-screw" nailers were perfected by Mr. Goddu, and the continuous screw-wire by Mr. Van Wagenen, of the American Cable-Screw Wire Company. Henry Dunham put out a machine to drive loose nails (afterward acquired by the McKay association), and L. Farnsworth a nail sorter for loading heels. The McKay heel machines were improved by Mr. Glidden, and others were brought out by Messrs. Baldwin, H. H. Bigelow, and E. Fisher, all of which became the property of the McKay and Bigelow Heel Machine Association. Welt and turned shoe machines were being perfected by the Goodyear and McKay Company, and lasting machines were made by Thompson, Copeland, Glidden, and Fairfield, which were finally merged in the McKay and Copeland Lasting Machine Association in 1882.

In addition to these, there were introduced during this decade a number of finishing machines, and such as were less essential, though still valuable in economizing labor; and among the more important of these may be mentioned the following: The Busell heel and edge trimmers, the Tapley burnisher, shank-burnishing and buffing machines, skiving machines, heel-stiffener and box-toe machines, boot-treeing machines, the Bray eyelet and lacing-hook setters, etc.

Before the year 1880 almost every possible line of shoe machines had been begun, leaving very little real pioneer work to be done, and many of the controlling patents had expired, or were about to do so. In December of that year the United States Supreme Court, which for years had regarded with jealousy the broadening of original claims by reissue, gave judgment in the suit of the Swain Turbine Company *versus* Ladd, which, though just in that case, rendered worthless many hitherto valuable patents.

These causes, and the growing feeling against monopolies,

turned the thoughts of inventors toward a division of profits with successful owners of patents; and since that time a great deal of invention has had this for its object. This, with the increasing difficulty of obtaining strong claims, though operating against the interest of capital invested in patents, and rendering capitalists very conservative regarding future investments, has not, so far as can be seen, injuriously affected the manufacturer; whether it will be a permanent benefit can only be told in the future. As yet the more trustworthy machine-makers have persistently continued to improve their specialties, and very many legitimate and valuable inventions have resulted.

Since 1880 the Goodyear Company has added to its catalogue the shuttle fair-stitch, the new welt-sewer, and several minor machines; and the Campbell shuttle, the Eppler turned-shoe, and the McKay high-speed machine have been introduced. The McKay and Bigelow Associations have improved the Fisher and issued the "Automatic" and "Rapid" heel machines, and the competing "National" and "American" heel nailers and several heel-slugging machines have been put out. The Busell Company has perfected its rotary trimmers, and others have been made by A. F. Smith, the Acme Company, and Glidden. The McKay Association has put out the high speed "standard screw" and several other perfected machines, and a variety of wire nailers have been tried on cheap work.

The "Boston," the "Hand method," the Copeland "Rapid," and the Chase lasting machines have been put in use, the latter on men's fine shoes; and the heel burnishers have been made automatic and an electric method of burnishing introduced, which bids fair to supersede the others. Besides these, button-sewing, button-fastening, lacing-hook, and a variety of subordinate machines have been made.

A Modern Shoe Factory.

Modern shoe factories are less uniform in size than the "ten-foot" shops of old Lynn, their area of floor space varying from 7,500 square feet in the smaller to 45,000 square feet in the medium and 200,000 square feet in the larger. The following statement of the size, machinery, and product of a factory making men's fine goods (that of Messrs. Hatheway, Soule and Harrington, New Bedford, Mass.) will give a fair idea of the business as it is at the present time. The plant occupies 41,240 square feet of floor, employs 325 hands, and turns out 1,000 pairs of shoes daily.

Sole-leather Room—19 hands, 25 machines

Stripping machine	1	Sole-dieing machines	3	Channel turners	2
Splitting machines	3	Sole-rounding machines	3	Rand splitter	1
Rolling machine	1	Sole-molding machine	1	Rand turner	1
Fisher compresser	1	Shank-skiving machine	1	Rand cutter	1
Heel-builders	2	Channeling machines	3	Rand tacker	1

Cutting Room—32 hands, 15 machines.

Skiving machines	4	Splitting machines	4	Tip-punching machines,	
Crimping machines	2	Pattern cutter	1	with 40 different dies	4

Stitching Room—104 hands, 44 machines.

Sewing machines	35	Turning machine	1	Eyelet machine	1
Seam rubber	1	Folding machines	2	Stud machine	1
Tip marker	1	Welt trimmer	1	Top-marking machine	1

Bottoming Room—148 hands, 40 machines.

Welt machines	4	McKay heel machines	2	Heel scourer	3
Lock-stitch machines	6	Heel-seat machine	1	Electric burnisher	2
Sole layers	2	Heel-slugging machines	2	Edge trimmers	6
Sole levelers	2	Heel-breasting machine	1	Edge setters	6
Tack puller	1	Rotary heel trimmer	1	Last puller	1

Finishing Room—13 hands, 26 machines.

Shoe-treeing machines	18	Bottom buffers	1
Bottom-scouring machines	2	Brushing machines	5

In all, 150 machines; and if the lasting had been done by machines it would have required eight or ten lasting machines. Besides these there are a few others sometimes used on this kind of work, and for pegged and nailed work several additional machines are required. On women's work the same number of workmen would be able to produce probably from twelve hundred to thirteen hundred pairs daily.

It is impossible to give an exact statement of the present condition of the business, from the fact that the bulletins of the census of 1890 relating to this subject have not yet been issued; but an attempt has been made to get the judgment of men familiar with shoe manufacture throughout the country as to the growth of the business since 1880, and probably their estimate is reasonably correct. During the last twelve years the industry has been growing more rapidly in the West than in the East, especially in the valley of the Mississippi and beyond. The increase is set for the whole country as from thirty to thirty-three per cent.

As seen in the accompanying Table I, there were; in 1880, 111,052 persons employed, receiving in wages $43,001,438, and producing goods valued at $166,050,354; and by the Massachu-

TABLE I.

General Statement of the Shoe Industry in the United States.

YEARS.	Factories.	Hands.	Total wages.	Yearly wages.	Number of pairs.	Value of stock.	Total value.	Capital.
1870	3,151	91,702	$34,003,555	$370.80	80,627,244	$64,402,174	$117,363,244	$30,015,215
1880	1,959	111,052	43,001,438	387.21	125,478,511	102,442,442	166,050,354	42,994,028
1885 *	* 2,366	* 69,531	* 26,916,608	* 387.12	.....	* 70,178,677	* 114,729,533	* 34,313,421

* Massachusetts only (census of 1885).

TABLE II.

Statement for those States in which more than Five Hundred Hands were employed.

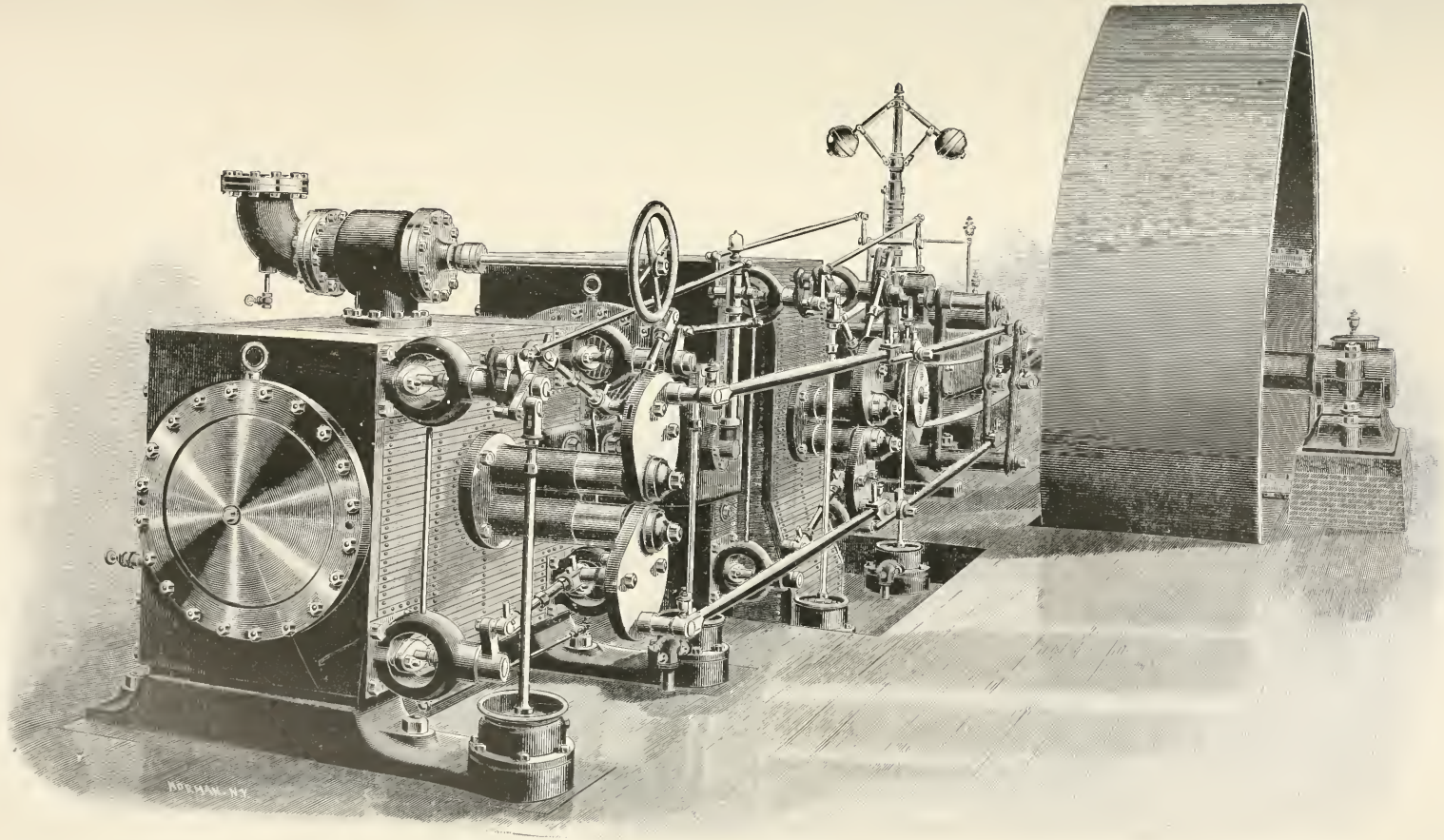
STATES.	1870.			1880.					PER CENT OF WHOLE.	
	Number of hands.	Number of pairs.	Value.	Number of hands.	Number of pairs.	Wages.	Value.	Capital.	Number of hands.	Value.
Massachusetts	51,167	55,572,959	$69,252,356	61,651	78,512,194	$24,875,106	$95,900,510	$21,098,133	.5551+	.5775+
New York	11,409	7,346,305	13,850,438	13,414	11,110,731	4,902,132	18,979,259	6,227,537	.1208—	.1143+
Pennsylvania	8,330	5,034,201	8,802,070	7,845	6,161,547	2,820,976	9,590,002	3,627,840	.0706+	.0577+
New Hampshire	2,777	3,320,621	3,824,016	4,434	7,409,271	1,792,832	7,230,804	1,696,200	.0400—	.0346—
Maine	2,105	2,089,159	2,524,177	3,915	5,675,854	1,325,168	5,823,541	1,369,000	.0352+	.0350+
New Jersey	1,990	1,071,882	2,264,258	3,318	4,146,222	1,278,269	4,689,286	964,245	.0300—	.0282+
Ohio	2,026	853,799	2,293,442	3,204	2,277,605	1,089,116	4,167,476	1,154,200	.0298—	.0251+
California	968	679,990	1,230,682	2,495	1,850,305	1,164,938	3,649,551	1,001,183	.0225+	.0220—
Illinois	1,274	551,691	1,838,509	2,060	1,459,611	755,769	3,183,026	1,729,200	.0177—	.0192—
Maryland	1,631	870,852	1,598,214	1,796	1,134,822	595,603	2,212,903	500,600	.0161+	.0133
Connecticut	1,918	966,900	1,551,722	1,412	1,328,900	529,058	2,211,385	631,000	.0127+	.0133+
Missouri	960	306,475	1,890,961	1,281	1,029,054	447,663	1,982,993	642,800	.0114+	.0119—
Wisconsin	927	286,352	945,342	1,177	966,194	381,732	1,736,773	548,800	.0106—	.0103—
Michigan	830	267,837	999,304	783	750,040	340,172	1,216,255	343,500	.0070+	.0073+

setts census for 1885, there were 69,531 persons, receiving $26,916,608, producing a value of $114,729,533.

Hon. H. G. Wadlin, Chief of the Massachusetts Bureau of Labor Statistics, in his report in 1891 has given the ratios of increase from 1885 to 1890, based on a comparison of the leading firms in the State, as follows: Number of persons, 9¼ per cent; wages paid, 30 per cent; value of product, 18⅓ per cent; material, 13.06 per cent; he also gives the profit for 1885 as 14.06 per cent on the capital and 4.35 per cent on the selling price, and the average yearly wages at $515.40 for 1890 and $504.39 for 1891. Assuming that Massachusetts does one half of the whole business in the Union, and using the latter ratios, we have:

Number of persons employed.....	140,186	Business of 1890.
Yearly wages (at $500 per year).....	$70,093,000	
Material used.....	$115,247,747	
Value of product.....	$266,172,516	
Profit to manufacturer (at 14 per cent)	$37,264,152	

The following publications have been consulted in compiling this paper: Newhall's History of Lynn; Shoe and Leather Trade, by Seth Bryant; Shoe and Leather Reporter, vol. liv, No. 5; Boot and Shoe Recorder, vol. xxi, No. 19; Reports by Hon. H. G. Wadlin, Chief of the Massachusetts Bureau of Labor Statistics; and some others.



The Frick-Corliss engine.

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CHAPTER IV.

THE PLACE OF CORPORATE ACTION IN OUR CIVILIZATION.

ONE of the first lessons of civilization—one which, when well learned, goes far in aiding men to great accomplishments—is found in the art of associated action. Among the primitive races the habit of combining endeavors to secure important ends scarcely exists. The first upward steps are taken in the work of war, when men are for a time subjected to a chief; another stage is where slaves obey the will of a master, and are by him directed to some profitable employment. A yet higher step is taken when laborers are engaged for some form of hire. The principle of partnerships, where men combine their capital and their endeavors to accomplish some business undertaking, was invented in relatively modern times, and finds a place in the social system of but few peoples. So far it appears to be practically limited to the Aryan folk, and probably has its highest development among people of the English stock.

For a long time partnerships seemed to afford a sufficient means for dealing with all commercial enterprises. Until within about fifty years nearly all our economic undertakings were in the hands of men who were related to each other by such bonds. Breaks in the succession of endeavors, such as are brought about by illness or death where the individual acts alone, were overcome by constantly renewing the members of the society by taking in junior partners. In this way the life of the house could be indefinitely perpetuated. In time, however, it was found that, good as this system is for most purposes, it is not well adapted to certain conditions which have arisen from the vast increase in the volume of work required in many branches of modern business. The result has been the invention and rapid extension of a new method of association, that of the joint-stock company. In these companies, as is well known, the property is represented by shares, which may be, and indeed often are, owned by thousands of individual capitalists. The management of the work is in the hands of officers elected by the shareholders, and

who in turn select the salaried people who attend to its business. Although at first sight it might seem doubtful to those who are unfamiliar with the management of corporations, whether they would prove as efficient as partnerships, experience has shown that in a wide range of business affairs they are by far the best means of securing the ends in view.

It is rare, indeed, that any one person is competent to attend to a very complicated business. He can not usually secure at any reasonable price the aid of thoroughly competent assistants, for the reason that their tenure depends on the chances of the survival of their principal, who before he succeeds is often an aged man. Partnership associations have a chance of being more fortunate in their work; but there, also, the choice of talent for the management of the work they have in hand is somewhat limited. The large corporation escapes these disadvantages. From among its shareholders the proprietors may commonly secure a very advantageous choice of the men to whom the business is to be confided, and these directors, in turn, may, as experience has shown, readily secure the services of persons required for the executive work. These employees can generally trust to the permanence of their occupation in a way that they can not do with individuals or partnership firms. It is doubtful, indeed, if the insurance, banking, or transportation business required in our existing economic life could have been developed or be maintained without the agency of our corporate system. In fact, the commercial progress of the last half century, to a great extent, has depended on the development of these institutions. Although the stock company is of considerable antiquity, having originated more than three centuries ago, its use was for a long time limited to certain particular fields of business. The early colonizing enterprises which acquired charter rights in this and other countries held their property in a corporate way. So, too, the great foreign trading companies, such as that of the East Indies and of Hudson's Bay. The next extension of the method was to insurance; yet later, banks were organized on this basis. The greatest enlargements of these organizations came when the needs of transportation led to the construction of canals, turnpikes, and railways. Recently a yet further advance in the use of this form of associated capital has taken place. At present almost all the large commercial enterprises in this country and in England have taken on the corporate form. It is now evident that the business of the future is, in the main, to be committed to such associations. It will there-

fore be worth our while to examine into the effect which this method of doing business is likely to have upon the commercial and social future of our people.

The inquiry which we are about to make is the more important, for the reason that grave fears have often been expressed lest the methods and influences of corporations should prove destructive to certain important elements of our American life. It has, for instance, been urged that, inasmuch as the corporation tends to make an end of individual undertakings in most commercial fields, it would thereby reduce a large body of our citizens to the state where they would become mere servants doing only routine duty at the command of superior officers. It has been furthermore suggested that the massing of capital in the control of a few men which this system engenders is likely to prove, despite all warrantable preventive measures of the law, dangerous to the political institutions of the country. It is also not infrequently urged that corporations, having obtained command of certain industries or sources of supply by consolidating sources of production or means of communication which were originally scattered in many hands, will be able to oppress the people by undue charges for goods or service. If any of these evils are really to be apprehended, we may indeed regard these institutions as menaces to the safety of our people; but we should not trust mere apprehensions or the existence of incidental wrong as affording sufficient reason for condemning a system of co-operation which has been naturally evolved from the needs of our modern life.

In examining the conditions which have led to the adoption of the corporate system in business we find that two ends are gained, each of which is of importance to the general public as well as to the shareholder. In the first place, the active capital of a community is by these associations readily and quickly massed and applied to the needs of particular kinds of work as they arise; in the second place, the persons who venture on a particular experiment are protected from any loss which may overwhelm their whole estate, as in the ordinary conditions of individual or partnership responsibility. It is manifestly of great importance to every community that various experiments of a costly kind should be essayed. A railway, for instance, is desired. The conditions of the enterprise prohibit its being undertaken by a private individual or an ordinary partnership. It is not likely that either could command the capital required, or could secure an adequately permanent administration. Therefore, if the work is to

be done at all it must be accomplished either by the State or by a corporation such as we are considering. It is contrary to the spirit of our governments, as they are at present framed, that they should undertake tasks of this nature. With us the only practicable way is to allow the people to do the work through a chartered corporation under such restrictions as experience may have shown to be necessary and justified. There can be no question that our country has profited very much by this mode of action in relation to railways and other similar improvements. There are few rational people who would question the fitness of the corporate method in work of this nature.

Substantially the same conditions of necessity justify the use of the corporate business method in the establishment of great factories and the development of extensive mines. Capital and management can both be best secured and employed in such undertakings by a stockholders' association. We, indeed, may make the following general statements concerning the conditions in which the corporate method seems the only safe way in which adequately to accomplish the advance of our industries, viz.:

1. Wherever an undertaking demands a large amount of capital which has to be put in risk of loss, the corporate method is warranted, for the reason that the responsibility is divided among many, and thus may bring grave peril to none.

2. Where the work to be done demands extended administration, calling for a great accumulation of ability, and needs to be continued for generations, the corporate method is desirable, for the reason that it provides against the accident of death or the risks of individual financial failure.

Into the above-mentioned groups fall a large though not very clearly limited class of enterprises which we have already named, and few persons who are well informed, even as regards the rudiments of commercial history, will doubt the usefulness and safety of committing these classes of undertakings to the care of corporations. The doubts of judicious people concerning the use of these economic instruments applies to the instances in which, as of late, they invade the field of occupations which has so long been cared for by private business men acting individually or in partnership. To many persons it seems most unfit that capital associated in large masses and administered by corporation methods should displace, as it is now doing, the numerous individual or partnership establishments which have hitherto done the particular kind of business. From an immediate point of view

it is indeed lamentable to find the trade of scores of small merchants ruined in order to make way for the prosperity of one of these associations. If we indulged our sympathy we should unhesitatingly condemn the innovation which brought these things to pass, but before a judgment is pronounced it is fit that we should consider the matter in a deliberate way. We should at first note the fact that all the important economies which have been introduced into the production and distribution of commercial products have led to the loss of occupation of many who depended on the earlier condition of the art for their livelihood. In fact, all economies which are secured are won by just such sparing of labor which up to that time had been spent. All our experience has shown that the inconvenience which thus arose was quickly overcome. The men who were dispossessed found other lines of employment, and they, along with the other members of the society, came, in the end, to share in the advantage of the change from which at first they suffered.

The proper way to consider any part of our commercial mechanism is to regard it as a means whereby men may be spared expense. Whether the given engine be a loom driven by hand, which is replaced by a more effective contrivance set in motion by steam; whether it be a stage which is replaced by a railway; or a number of small shops or stores which are replaced by a great manufactory or distributing warehouse—experience shows that we have always to expect a considerable amount of disturbance in the social conditions of the people who make the advance. Just as there are pains of growth in the child, there are distresses of development in a civilization. It is important that they should not be mistaken for indications of disease.

There can be no question as to the substantial economy which can be effected by the consolidation of our industries in the manner accomplished by the corporation. This economy may be effected in several ways. Thus, for instance, in a town of a hundred thousand inhabitants there are likely to be at least two thousand persons engaged in trade—that is, in bringing about the distribution of goods of one kind and another, so that the people may find their needed supplies conveniently at hand. Each of these traders acts independently in his purchases and sales. His success or failure depends upon his business capacities, and statistics show that more than three fourths of them fail in their endeavors and are in time ruined. Each of these mischances is costly, not only to the individual but to society at large. The

bankrupt man suffers not only in person but through his family and those who depended on his solvency, and therefore gave him credit, are likely to be embarrassed or ruined in consequence of his misfortune. There can be no doubt that what we may call the tax of bankruptcy is the heaviest burden which our commerce is called upon to bear.

If, in place of the two thousand merchants who now care for the distribution of supplies of a hundred thousand people, the work could be assigned to say half a dozen corporate establishments, the saving, both of labor and of loss, through failure, would be very great. In the first place the management of the establishments would, by a due process of selection, come into the hands of the men who had the greatest measure of business capacity. This would tend to reduce the element of danger which arises from having the important tasks of commerce committed to a large number of people, few of whom have any natural fitness for the duties they seek to discharge. Moreover, these companies could, by a proper organization of their executive force, effect a considerable economy in every step of the distribution. They would be able to buy directly from manufactories; they might, indeed, take all the products of great factories, and thus avoid the expense of maintaining jobbing houses or wholesale dealers, as well as the risks of failure which are encountered by these intermediaries. Another economy would be found in the element of insurance against loss and consequent financial failure which can be attained only by very large establishments. It is evidently impossible to devise any system of insurance whereby individuals or firms can be guaranteed against insolvency. The nearest approach to this end has to be attained by amassing capital in such a manner that incidental mischances can not seriously affect the credit of an enterprise.

Having now considered the evident advantages which can be attained in commercial work by means of corporations, we will turn our attention to the evils which are supposed to inhere to the system. The first and most evident of these is fairly represented by the common phrase, "Corporations have no souls." The idea which it is intended to convey by this epigram is as follows: In an ordinary business house, conducted by an individual or by partners, there is always some one with full authority in all that relates to the conduct of the business. If it is a question of granting a favor to a debtor, he can act, if he please, in the manner dictated by his sympathies. He is held, indeed, by no rules which

are not of his own making. In the case of a corporation, however, the executive officers naturally can have no such freedom of action. They are guided in their conduct by rules framed by the governing body, and which are likely to be devised without reference to individual needs.

Another evil which is apprehended from the corporate system is expected to arise from the fact that when the system is completely instituted we shall have, in place of the independent business men of to-day, each gaining his livelihood by his success in a wide range of thought and action, a body of clerklike functionaries, each of whom will do a certain limited kind of work at the command of his superiors. A third possible damage to the interests of society is expected to arise from the disposition of great corporations, when they have control of a particular kind of business in a large community, to increase their profits by excessive charges. Yet a fourth danger is supposed to be threatened through the occasional insolvency of the companies and the consequent perturbation of the society which they serve. We may now proceed to examine into the validity of these criticisms, endeavoring in the inquiry to ascertain how far they are justified by experience, and what correctives of the real evils may be expected through the influence of public opinion or by legislative enactment.

There is doubtless much truth in the epigram we have already cited, which denies any spiritual quality to corporations, but, before utterly condemning them on this account, we should consider how far the element of charity does and should enter into the conduct of business affairs. On this point it may safely be said that no discreet commercial man feels justified in permitting his sympathetic motives to enter directly into his business transactions. He takes pains to separate his benevolences from his commercial affairs. If he has a clear view of the functions of his art in the social system, he recognizes the fact that he is the governor of a machine, which for its own safety has to operate in a very mechanical manner. Where his conscience dictates that he should relieve a man who owes him money, he will, if he is guided by a full sense of his responsibilities, afford the help from what we may call his private means, and not from that which is engaged in his trade. His first duty as regards that trade is to maintain its solvency; his highest obligation is to secure that end. Thus the principles of sound conduct appear to dictate that the distributive engines of commerce should operate in a formal and

mechanical manner, and that benevolence should, in a full measure, be exercised in ways apart from trade. In a word, owing to his important and complicated relations to society, the trader must recognize the fact that the capital embarked in his business has ceased to be altogether his own; it has, in effect, become a part of the property of the society to whose needs it contributes. Only his profits set apart for his private use are properly disposable in the charities which he should maintain.

It thus appears that the sound principles of business conduct are substantially the same, whether the commerce be controlled by individuals or by corporations, the difference being, so far as the charity is concerned, that in the larger establishments there is less danger that the functions of trade may be imperiled by the motives which lead to benevolence. In the present condition of our society, where the spirit of charity is increasing with unprecedented speed, there seems little reason to apprehend that the aggregate efficiency of this motive, which leads to the help of the neighbor, will be at all diminished by separating it from commercial affairs. In fact, we may hope that the help which will be afforded to distressed individuals will be greater and more efficient under the new system than in the old. In this connection it should be noted that, with the disappearance of the small trader, which is now in the way of being effected, a large part of the misfortunes attendant on commerce will necessarily disappear. Every one who is acquainted with the conditions of our affairs recognizes the fact that a large part of the distress which prevails in our civilized communities arises from the commercial mischances or misfortunes which overwhelm men in trade. To help these people it is generally necessary for the charitable man to put a good deal of money at risk. In almost all cases such charity is ill bestowed, for the relief which it affords is of a temporary nature. In a state of commercial affairs, where the work of production and distribution was accomplished by enduring corporations, this perplexing class of needs, brought about by the insolvency of small capitalists, would disappear, and the need of charity would be limited to far more manageable cases which can to a great extent be provided for by some form of insurance, such as those which arise among decent people from sickness or old age. In so far as the corporate method may serve to diminish the field of calamity, it will certainly be a blessing.

We will now consider the effects which are likely to arise from the conversion of the independent man of business into the clerk

or executive officer of a corporation. Unquestionably, in this change of relations most of these men will find their field of thought and action much narrowed. Only a few of the superior officers in a great corporate establishment are so placed as to deal with the wide range of affairs. The greater part of the executive force necessarily does what we may term clerical work. There can be no question that this alteration will, so far as the educative influences of the employment are concerned, narrow the lives of men. If, indeed, the culture of our citizens depended in the measure that it once did on their professional employment, we might look with regret, or indeed with apprehension, upon this system of corporate work; but in all that relates to general development such occupation is day by day becoming a less important element of enlargement in the lives of men. Year by year the system of routine work is more and more arranged so that those who do it have the time and opportunity for general culture in fields outside of their bread-earning vocation. The hours of labor are steadfastly shortening, and most business men have now the chance to broaden their lives in the way their tastes may suggest by a proper use of their spare time. So advantageous is this system that many intellectual men without fortune seek clerical employment, often such as brings grave responsibilities, for the reason that when their required work is done they can put aside all care in a way which is impossible to the business man who is acting in an independent manner.

As to the ills which may accrue from the disposition and ability of corporations when they have gathered a particular branch of production or distribution in their hands to demand an undue profit from their transactions, experience enables us to make the following statements: Many corporations now exist, some of which may be found in every large commercial community, in which the association has practically absolute control of some branch of trade. There are, for instance, railways so placed that they afford transportation to a considerable region without meeting any competition whatsoever. Thus, the Old Colony system has entire control of the carriage of passengers and goods in southeastern Massachusetts; the Long Island Railway, in New York, is also without a competitor; and there are scores of other similarly conditioned transportation routes. The general experience is that these corporations are wisely content with revenues on the average no greater than are earned by those in other parts of the country where competition has to be encountered.

A yet more instructive instance is afforded by the case of valuable American patents. The business which is founded on patented inventions is a monopoly from which the proprietors have to win all their profits in half the lifetime of a generation. In general, indeed, even with the most successful inventions, the time during which the monopoly is economically effective is not more than ten or twelve years. In most cases the expense of the invention to the public during the lifetime of a patent is so arranged that when the right expires the decrease in the cost of the product is not greatly diminished. The reason why most monopolies are so managed as to be little oppressive lies in the fact that capitalists wisely prefer the gain which comes from an enlargement of their business, even though it be brought about by a nearly proportional decrease in the amount of profit which they secure. In this way they tend to avoid competition. Even the owners of a valuable patent wish to prevent the introduction of competing inventions or the infringements which are likely to be perpetrated where a small manufacturer may win a large return from such action. We may expect that wherever, in any community, a branch of trade which had fallen into the hands of a large corporation was made unduly remunerative, the citizens could at once apply a corrective by instituting another association. In any free country this check would always be operative in all the branches of trade.

It is evident that the danger of monopoly is greater where the vast aggregations of capital which such associations may command is used to secure absolute control over certain natural resources, as, for instance, the rarer metals or other earth products, or the deposits of the commoner minerals which have a peculiar value on account of their position in relation to particular industries. So far the evils arising in such cases have been inconspicuous. In fact, the present writers have not been able to find a single trustworthy instance in which any important earth product has been thus monopolized; but if such cases should occur, we should doubtless find that the desire to secure speedy returns from the capital invested would lead to the marketing of the materials as rapidly as possible. To accomplish this end it would be found necessary to put the price at a point which would greatly stimulate the consumption; this would generally be not very much above the cost of bringing it into the market. In all such cases we have to remember that, although on the principles of its organization the stock company may have an indefinite life, its

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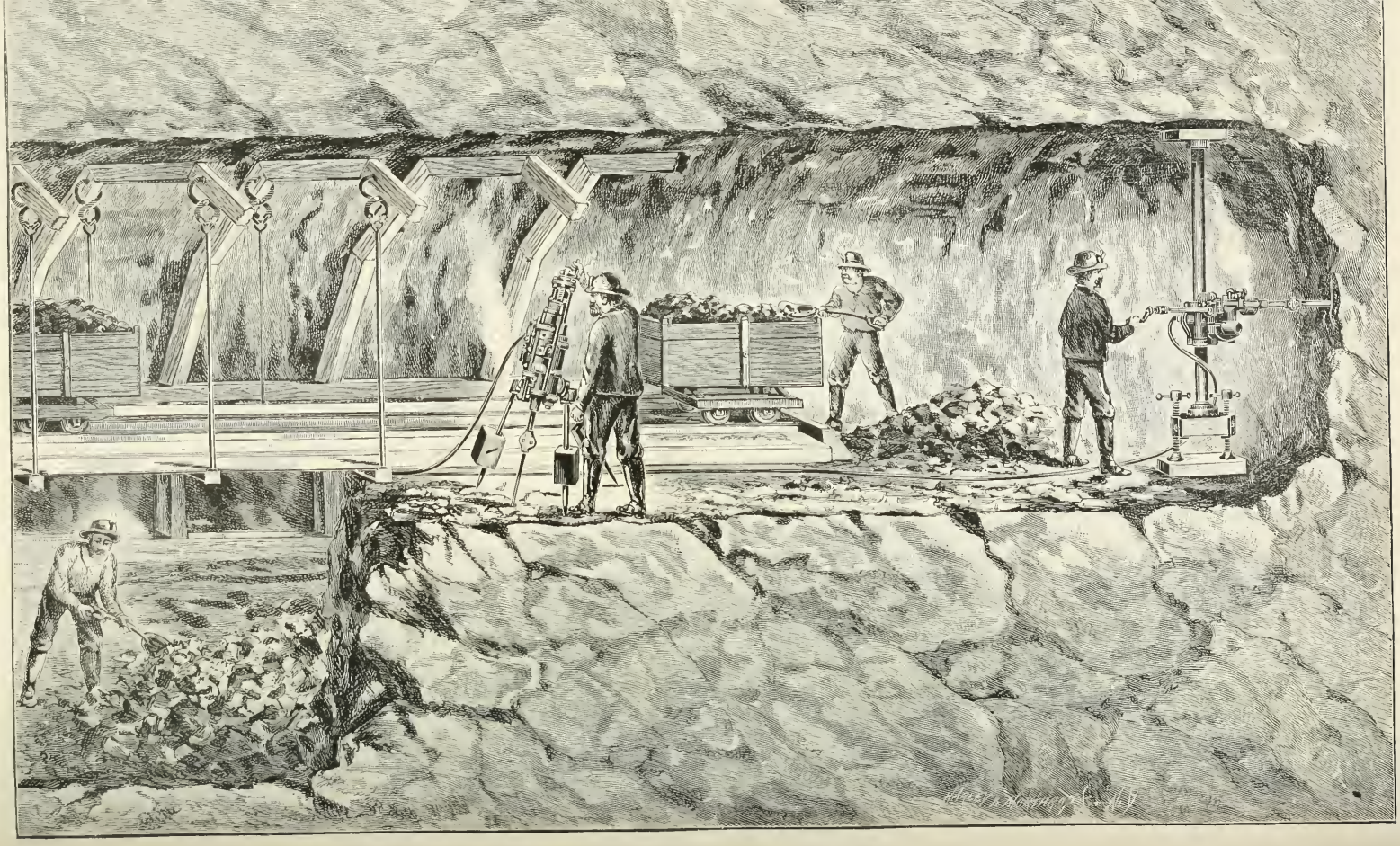

Driving the Niagara tunnel by rock-drills.

shareholders are ever actuated by the desire to have as large as possible return from their investment, and to obtain this return as soon as it can be had. Experience shows that this end can almost always be best attained by that wide extension of demands which can only be secured when the given material is marketed at a price which is, on the whole, favorable to the consumer.

The natural distribution of American minerals is such that, notwithstanding the rapid extension in the size of our greater stock companies which expend them, it is to the last degree improbable that any of them will ever succeed in securing a substantial monopoly of these natural resources. All the important underground materials which enter into commerce are widely distributed. They are found in every great land, or are likely to be discovered by proper search. In our own country they occur in various fields. Owing to the ever-increasing cheapness of transportation, it is constantly becoming more and more difficult for any associations to obtain control of these seats of production. If such monopolies should hereafter arise, they will have to be dealt with as the other evils of that future, by the generation which is then responsible for the well-being of society.

In considering the place of corporations in our society, it is necessary to bear in mind the fact that these institutions lie clearly in the trend of economic development as it is indicated in all civilized countries. In all these lands, from the time when the people emerged from barbarism, the tendency has been ever to increase the amount of capital required in economic ventures. At first the individual business man was found competent for the undertaking; then commercial partnerships, ever including more and more individuals, became the principal instruments for conducting trade; then the smaller corporations came into use, but were applied to a limited range of business pursuits. Lastly, we find the corporate method undergoing the extension which we now perceive, and which bids fair to centralize those forms of labor which are connected with the production and distribution of useful commodities. That the corporate method has advanced further and faster in the United States than in any other country is due to the fact that our community is less hampered by tradition, and our folk quicker to perceive the conditions of business which make for profit. This history of stock companies shows that their development has been brought about by the necessities of commerce, and not by the will of designing persons who were seeking their personal profit alone. As the corporation in its

present extended relations to our business life is a new institution, it need not be a matter of surprise that it does not prove altogether satisfactory in its modes of action. There are doubtless evils which at present inhere in the system which may be avoided when the methods which are suited to their correction come to be applied. The remedies may be looked for from two sources. In the first place, we may expect that the influence of public opinion, which is already potent as a corrective of many evils and is continually growing in this respect more efficient, will of itself remedy such tendencies as may appear in the management of these institutions in the direction of monopoly. In the second place, we may fairly look to legislative action for the avoidance of any dangers which are not corrected by the more immediate and generally more efficient influence of the public judgment.

It is manifestly undesirable to deal with the work of corporations by special legislation in any greater measure than is absolutely necessary. It is disadvantageous in all cases to have the public accustomed to look to the law as an agent which shall qualify business transactions, especially in all matters where the redress which is sought concerns obscure offenses. Thus the law can not properly prescribe the interest on his capital which any business man shall win from his trade. It appears equally undesirable to have this prescription given in the case of corporations, except where they may have received a grant of special privileges, such as are given to a railway in its right to take lands by condemnation and to cross public roads. The judicious students of this class of questions are of the opinion that the most the State can do at present is to require of these corporate bodies that they make an annual exhibit of their accounts, somewhat after the manner which is prescribed in the case of our national banks. Under a proper system of State inspection these showings, without revealing unnecessary details of the particular business, would inform the public as to the rate of profit which the association was winning, or of its exact status in case it had incurred a loss. The effect of this publication of the balance sheet would be beneficial in many ways, and it is doubtful if after a time it would appear to the persons concerned to be a serious invasion of their rights. It may be noted that all the banking and railway corporations are accustomed to make the important elements of their accounts public, and to perform the task in most cases under the supervision of appointed public officers.

The warrant for requiring the disclosure of accounts above

suggested in the case of corporations, while no such condition could be thought of in the case of persons doing business individually or in partnership, is found in the fact that stock companies are granted certain privileges and immunities which are not given to merchants acting in their private capacity. Men doing business on their own account are individually liable for all the debts which they or their partners incur. In American stock companies, at least, there is a limit to the liability which is sometimes set at the value of the shares which the person may own, and is rarely, if ever, for more than double that amount. How valuable this immunity is may be judged by the fact that when, a few years ago, the Bank of Glasgow, in Scotland, failed for a very large amount, every one of the stockholders was ruined by the calamity, and a number of people of fortune, who held shares merely in trust, were likewise made entirely penniless. Moreover, most corporations are granted either perpetual existence or a long term of action. This, along with the privilege of limited liability, may be regarded as special concessions on the part of the public conferring rights which differ in the circumstances of their origin from those possessed by individual business men or ordinary commercial firms.

A modification of corporate action has recently been devised under the name of "trusts," which has occupied a large place in public attention. Not only have "trusts" been criticised in the newspaper press, but on grounds of public policy they have been objects of attack through legislation calculated to put them under restraint, if not to prohibit them altogether, while in the courts of law a series of proceedings have been initiated against them by the prosecuting officers of the Government. It is a general characteristic of these "trusts" that they are formed by uniting, under a contract as to the conditions of sale of their products or distribution of their trade, a number of previously existing business enterprises in some field of activity. These associations are devised, not with a view of undertaking new activities, but for the purpose of securing, so far as possible, a monopoly of the business with which they are concerned—with a view to regulating, if not absolutely controlling, the competition which experience has hitherto shown is unrestrained, and not without its deteriorating influences both on commercial products and business morals.

The argument commonly advanced against "trusts" of the character referred to is that, so far as they are entered into by corporations, they are perversions of the privileges conferred on

corporations by law and in contravention of accepted principles of sound public policy; and accordingly that society may fairly say to such associations: "It is not for the purposes you have in view that we grant the immunities which we have given to corporations. Your endeavors are contrary to good customs, and can not have the sanction of the law." It will, of course, be difficult to draw the line between the stock company and the "trusts," but it is the function of the courts to decide such matters.

Conceding for present purposes the pernicious character of "trusts," it is important to have it understood that the evils which inhere in the system arise from a perversion and in no wise reside in the corporate system. Like any other good instrument, this most powerful engine can be applied to unworthy purposes. It will be unfortunate for the interests of commerce and to the people in general if any of the popular odium which applies to "trusts" is transferred to legitimate and generally beneficent corporations.

But, again, it is open to question whether the case against "trusts" has been in point of fact so clearly made out as is generally assumed. It is notorious that attempts to control production or establish monopolies have almost invariably, if not indeed in the long run invariably, resulted disastrously to those concerned in them. The production of the world is now so great and so varied, the means of communication so rapid and those of transportation so perfect, the accumulation of capital is so great and the desire to employ it profitably so eager, that it is most difficult and dangerous for any accumulation of capital, no matter how great, to interfere with the natural course of trade. Accordingly, and as a matter of fact, "trusts" have hitherto endeavored to make their profits rather through concentration and economy of appliances, and the dispensing with duplicate and costly officers and plants, than by raising the cost of their product to the consumer. Wherever they have been permanently successful and maintained themselves, it has been through the fact that they have succeeded in supplying to the public the product they were believed to control at a less price than others could afford to supply it. They thus drove competitors out of the trade; and it is from those thus driven out of trade that much of the denunciation of "trusts" has arisen.

The argument advanced is that the reduction of cost is, so far as the general consumer is concerned, merely a temporary and perilous advantage, for the obvious reason that, so soon as the

"trust" has secured control of the market through low prices and driven all its competitors from it, its policy will undergo a change, its prices will be raised, and the public will find itself at its mercy. But it still remains to be proved whether, as a matter of fact, and in face of the modern forces just referred to, this is not a purely imaginary danger, or, in any event, one which the laws of trade may safely be depended on to deal with and correct. Even should those laws prove inadequate, it is doubtful whether legislation or the process of the courts can make good their deficiency. The experience of the past is unquestionably the other way. Almost every development to meet some new commercial need or phase of change has, in its early days, been looked upon with popular disfavor and declared to be opposed to recognized principles of public policy. This was notoriously and long the case with corporations themselves. Yet, though the power of Legislatures and courts has, ever since those institutions have existed, been repeatedly and continuously appealed to to restrain, if they could not prevent, each novel trade appliance, it may be questioned whether an attempt made in answer to such an appeal was ever crowned with permanent success. Trade in its natural efforts at development may indeed be hampered, retarded, and for a time restricted; but if the effort at development results from a real existing need, it is sure to establish itself in the end. If it results from no such underlying need, it will in due time fail of itself. In neither case, according to all human experience, is the intervention of Legislatures or courts productive of beneficial results. The rule is so generally true that it may be said to be invariable, that trade evils work their own remedies most efficiently when left to do so in their own way; and this would almost unquestionably be found to be the case with "trusts." As already said, excessive or undue profit in any branch of trade or production can no longer be maintained for any considerable length of time in face of existing commercial conditions.

We have now to turn our attention to a question which is closely related to the growth of our corporations, namely, to the modern tendency to the massing of capital in great accumulations. With the vast increase in the quick capital of modern society—an increase which is at once the measure and the agent of much of our prosperity—conditions have come about which lead to the gathering of this form of wealth in relatively few hands. In fact, these curious concentrations of wealth are a characteristic feature of our modern economic life. Not only in their bulk but in

their nature these modern fortunes differ from those of ancient days. In ancient times the rich man might have a hidden store of coins, jewels, works of art in his dwelling, slaves in broad fields, or in his mines and ships upon the sea, but all his wealth was of a visible nature, and required management by himself or his steward. At present the vast fortunes, with rare exceptions, are represented by shares in stock companies. Under the old system the management of a great estate required incessant supervision. There was a limit to its bulk which was determined by the need of continual personal care; but the shareholder, if he be wise in his investments, may trust his money entirely to the custody of persons who are quite unknown to him. He can profit by the fidelity and commercial skill which exists throughout the world; he can divert some share of every river of commerce into the rising sea of his treasury.

It is often supposed that these accumulations of wealth which are gathering in the hands of rich men and corporations take place at the cost of the pockets of the citizens. That the rich are growing richer and the poor poorer in our society through this distribution of wealth, is assumed by many who hastily consider the matter. Experience shows that this is not the case. Incontrovertible statistics indicate that the laborers of all classes in this country profit by the gain which society is making in wealth, though their share is far less considerable than that which is obtained by the individual rich man. A more careful examination of the facts concerning the conditions under which capital is gathered, stored, and distributed has led students of this question to the following well-affirmed conclusions, which are among the more substantial results attained by the science of political economy:

In the primitive condition of men the day's labor sufficed for little more than the day's needs. So far as wealth was concerned, the tribe was no richer at the end of each year than before. With the advance toward civilization a gain began to be made. Food, clothing, and utensils not required for immediate use were left in store, and formed a more or less sensible body of wealth which could be distributed by exchange. In time a system of barter or regulated exchange of these products at somewhat fixed values was devised. Yet later, a currency, first of coins and afterward of paper notes issued by individuals or the government, served to further and simplify the process of exchange.

Until the modern period of mechanical inventions the amount

of this surplus which was not required for the immediate needs of the community was always relatively small. It could at most suffice to maintain the people who owned it for a few months. A large part of this surplusage was necessarily devoted to buildings, particularly to those which served for defense against their ill-regulated neighbors. With the development of mechanical inventions the increase in the store which we call wealth went on with ever-increasing rapidity. Each piece of mechanism which spared labor or made it more effective, even if the tool were as simple as an axe, served to increase the store of capital which the user could contribute to the society in and for which he labored. These contrivances of a mechanical sort assisted far more in the accumulation of wealth than the earlier forms of investment, such as dwellings or castles or arms. Such investments demand a share of the surplus earnings of the people for their maintenance. Machinery directly contributes, and generally at a rapid rate, to the gain in capital which is made by the community. The result is that in our mechanical age the increase of wealth has gone on so rapidly that the gains among the English-speaking people in the last century of their life doubtless far exceeds all the profits of the thousand years before.

So rapid has been the increase of capital in the United States during the last half century that the methods of its distribution have not yet been clearly determined. Its flow may be compared to that of a river which has not yet shaped its channel, but is irregularly flooding, as it wanders to and fro, the lands which it should irrigate and fertilize. Although we can not well foresee the precise adjustments which are to determine the course of the stream of wealth, we can perceive certain general facts which needs must guide it. In the first place, we see that every gain in the husbanded resources of society, which we commonly term its wealth, represents the toil of precious human lives. Though rapidly gathered, it has been won as the fruit of toil directed by masterful intelligence. It is this intelligence, rather than labor, which made the accumulation possible, and the same rational element is necessary to preserve the wealth against loss. It requires but a glance to show us that, along with the increase of wealth which arises from profitable labor, and which is constantly increasing the reserves which are available for the comfort, convenience, and safety of society, there is constantly going on a process of loss which tends to diminish the aggregate store. Every failure in mining, manufacturing, or other economic work, every loss by

fire or shipwreck, every premature death, every war, in fact each and all of the losses arising from the lack of intelligent management, serves to diminish the store of capital which might bring greatness to a state or add to the comfort of its people. We thus see how important it is that the care of this capital or wealth of a country should be in the hands of persons who by nature and training are best fitted to be its keepers.

The question of how capital is to be preserved from loss through all kinds of misadventures is, in fact, one of the most serious problems which our modern society has to face. In proportion as the evident needs of a community in the way of production and transportation are supplied by the various necessary establishments, it constantly becomes the more difficult to invest the accumulation of the people in a safe way. A natural and fit application of a part of these reserves is made through a gain in the rate of wages by which men in all grades of employment are receiving for their immediate use, in more comfortable and enlarging living, an ever greater share of the accumulating capital which is gathered in each country. It seems likely that before long this method of distribution will prove so effective that the rate at which the accumulation of capital is made will rapidly diminish. Nevertheless, as these reserves of wealth afford the foundations for all continuous prosperity, and are indeed the condition on which prosperity can be secured to the masses of the people, the question of their management will always be serious.

So far the only way which has been discovered whereby the wealth of society can be efficiently guarded against loss by misadventure consists in leaving it during their lifetime in the hands of the men who have been able by their intelligence to gather and husband the store, giving to these individuals the right to determine within certain limits the use of the wealth after their death. This plan, indeed, is not the result of any contrivance, but has come about in a purely natural manner. The law of ownership, as well as that of inheritance, rests on the primal facts of human nature. It is obvious to all who have examined into the history of the matter, that the experiments which have been made looking to the transfer of these precious savings to the custody of the State or of communities have been uniformly unsuccessful. Even the apparent exceptions to this rule prove, on examination, to have no validity. Thus, where, as in the case of the Shaker settlements in this country, the capital of the societies has been well guarded, we always find that its care has been confided to certain

masterful men who have served the community in a manner in which the chief executive officers of our corporations administer the trusts which are confided to their care.

It would be an instructive task to compare the great corporations of this country with those of the Old World. An analysis of the facts would doubtless serve to show that the peculiarities of American life have set their seal on these as on other modes of national action; this undertaking, however, would be beyond the limits of this work. We can only give space for three instances, which may serve to show the way in which associated endeavor has accomplished momentous results, selecting these from the host of examples which are at hand so as to show how our people have acted in certain peculiar conditions. The corporations which we shall select are the Union Pacific Railway Company, the Mutual Life Insurance Company of New York, and the Standard Oil Company.

The discovery of gold in California, in 1848, and the marvelous development of mining industry in this our newly acquired territory, together with the rapid increase of agriculture in these rich fields, made it most desirable to have some quick and internal means of communication between our people in the Eastern and Western parts of the United States. The journey by way of Cape Horn or Panama retained the settlements of the California coast in the position of remote colonial dependencies. Thus it came about that, after much debate, Congress, in July, 1862, authorized the formation of a company, with a maximum capital of one hundred million dollars, to build a railway from Omaha, Neb., westward until it should meet the Central Pacific road, then under way from San Francisco eastward.

Although the Union Pacific Railway Company was constituted as a private corporation, it was by its charter made the recipient of imperial gifts. For each twenty miles of road constructed the company received alternate sections of land for the distance of twenty miles on either side of its way, or the equivalent of a share of the public domain a score of miles in width through which its track ran. It received, in addition to this vast gift of territory, a loan of sixteen thousand dollars per mile over the plains from Omaha to the Rocky Mountains, forty-eight thousand dollars per mile for a hundred and fifty miles in the Rocky Mountain section, and thirty-two thousand dollars per mile for the remainder of the distance. For this loan from the Federal Treasury the national Government agreed to take second-mortgage bonds, the corpora-

tion being allowed to issue its own bonds for an equal amount, these to have the first lien on the road. The Federal loans were made with the additional favorable condition that no interest was to be paid for thirty years except five per cent of the net earnings; it was provided, however, that one half the charges for Government transportation and telegraph service were to be retained by the United States Treasury, and credited to the corporation.

The bonds issued to the Union Pacific Railway Company amounted to $27,226,512, and on January 1, 1890, about fifty-one millions of principal and interest was unpaid, which, with further interest, will be due in the years 1895–'99, when the total debt due the Government will amount to near sixty million dollars. In the present condition of this great railway it seems clear that this sum can not be paid without doing grave wrong to the thousands of people who hold the stock of the corporation, or to the yet larger number who depend upon the road for facilities of transportation. To pay an interest on this additional sum, the charges for transportation would have to be much increased; to defer the payment of this loan until the traffic of the road becomes sufficient to justify the increased charge will be to postpone the reimbursement indefinitely. In fact, the investment which the Government has made may, under any possible conditions, be regarded as substantially lost.

The celerity with which the Union Pacific Railway was built was a creditable and inspiring feature in the history of our people. Its construction was of vast and immediate advantage to the whole country; as a measure of military prudence from the point of view of the defense of our territory bordering on the Pacific, it may fairly be said to have been a matter of absolute necessity. Unhappily, however, for our national reputation, though naturally enough, as the experience of other countries has shown, this method of Government aid gave rise to grave and far-extending scandal, which involved the reputations of many of the members of our Federal Congress and a number of distinguished private citizens. It is clear that a portion of the money and land which the Government lavished on this enterprise served to enrich speculators and to debauch the country. The experiment may fairly serve as a warning to prevent the Federal Government from further ventures of the same nature.

The Mutual Life Insurance Company of New York, a corporation which was chartered in 1842, affords one of the most instructive examples of the results which may be accomplished by

Wide-cut combination harvester.

associations which are entirely independent of governmental control, except so far as the law may require the publication of their accounts. The property of this association is not represented by stock, and it has no capital except that which has accrued from premiums paid for insurance and the interest on these accumulations. The permanent investments, which amount, indeed, to a very large sum, are accumulated merely as a guarantee against calamities, such as may come from widespread and fatal epidemics or from disasters to investments. Other profits are divided from year to year with the policy-holders in proportion to the amount which they have paid in.

The government of this association is in the hands of thirty-six trustees, one fourth of the number being elected by the policy-holders each year. These trustees or their representatives, the officers of the company, are required to make an annual statement for publication to the Comptroller of the State of New York.

In the first year of its existence The Mutual Life Insurance Company of New York issued 470 policies, and received in premiums the sum of $37,000. At the close of the year 1892 there were 246,650 policies in force; the total receipts of the corporation were $40,200,000, and the claims paid in that year amounted to $19,400,000. Since the organization of the company it has received in premiums $455,000,000, and has expended in claims due to its members $346,000,000. The expenses of its management have amounted to $75,000,000; it has now invested $175,000,000 as security for the claims which may be brought against it. During the whole of its prosperous life this corporation has been free from suspicion of grave mismanagement; it is doubtful, indeed, if there be many private business houses of equal age which have been so generally free from the evils of this nature.

Although it has been necessary to single out one of the insurance companies of this country for comment, it may be said in general that these protective associations, life—fire, and marine alike—have, from the integrity and skill with which they have been managed, been eminently creditable to the honesty and business capacity of our financiers.

The Standard Oil Company, or Trust, as it is generally termed, affords a third and very peculiar type of American corporations. It is particularly interesting from a historical point of view, for the reason that it was the first great and eminently successful association of its kind to be organized in the business world. The conditions of its formation can only be understood by noting the state

of the petroleum trade at the time when the company entered on its remarkable career.

Until 1859, when the first bored well on Oil Creek, in Venango County, Pennsylvania, began to produce oil, this substance had been obtained from small natural springs or by distilling coal and carbonaceous shales. The production made possible by this new means of access to the underground supply increased with startling rapidity. The oil supplied a need which had hitherto been satisfied with much costlier products, so that it made its place in commerce with exceeding celerity. Though at first great fortunes were realized from the wells, the trade soon became mismanaged; the production of crude oil was excessive; a vast amount of it went to waste; refineries were multiplied beyond the demands of the business, and the losses became almost as numerous and as great as the profits which had been won in the first stages of the industry. The methods adopted for storing the product of the wells and for conveying it to market were rude, and not adapted to the peculiar needs of the business. It is doubtful if in the history of the mercantile world such an opportunity was ever presented for able men to begin a system of control which should bring an important industry out of its chaotic conditions.

The first steps taken by the Standard Oil Company brought about a consolidation of the productive wells, which led to an arrest of the excessive production of refined oil. This in turn led to a diminution in the number of wells which were bored, and thus to a partial limitation of the excessive draft on the underground stores of oil. The methods of refining were rapidly improved, so that in the course of a few years petroleum ceased to be the dangerous substance which it so generally was in the earlier states of the art. The next step was toward the improvement in the method of transportation. Pipe lines were laid from the principal sources of supply to the nearest convenient shipping point on the main lines of communication. Finally, similar but more extended lines were constructed, leading from the oil fields to the seacoast. A further progress in the method of transportation was marked by the construction of tank ships, by which the petroleum was sent to foreign ports. Within five years after the Standard Oil Company began its work the oil trade was brought into as satisfactory an economic condition, so far as the general public was concerned, as any other industry in this country.

It has been asserted, and perhaps justly, that many private

holders suffered grievously from the destructive competition which this company brought to bear upon their trade. As to the measure of wrong-doing which may have attended the changes which this company instituted, it is not the province of this work to discuss. It is, however, clear that the work done by the corporation is one of the most remarkable pieces of achievement which have been accomplished in this country, and does great credit to the organizing power of our business men. It may be said, moreover, that the evils of speculation and failure attendant on the conditions of the oil industry between 1859 and 1865 were very serious, and that they ceased with the organization of the Standard Oil Corporation.

CHAPTER V.

OUR CITIES.

THE cities of a country do not necessarily illustrate its chief national characteristics, nor do they always indicate the degree nor the kind of its prosperity. They are, however, its most conspicuous social and industrial features, and in some respects its most interesting features.

The cities of the United States—those of them that have a population of not less than eight thousand—contain nearly one third of its total population and of its total wealth. They afford no obvious index of the extent and importance of the agriculture, the mining, and the lumbering which develop our three greatest "natural resources." Nor do they represent to any considerable degree the enormous population engaged in this development. They are, however, the expression of nearly all in our population and in our property that has to do with the interchange and the further development of the products of these primary industries.

The great increase of the country and of the population has been attended by a still greater increase in its cities. Considering in this study only such places as have over eight thousand inhabitants, it appears that in the year 1800 there were only 6 cities of this class; in 1830 there were 26; in 1860 there were 141, and in 1890 there were 443.

In 1800 the total population of the cities was 210,873, being only 3.9 per cent of the population of the country; in 1830 it was 864,509, or 6.7 per cent; in 1860 it was 5,072,256, or 16.1 per cent; in 1890 it was 18,235,670, or 29.12 per cent.

If the limit of population were reduced from eight thousand to four thousand, the result would be even more striking. In 1880, nearly thirteen million—about one fourth of the entire population—lived in communities of not less than four thousand each.

Although in 1790 Philadelphia was the larger by more than fifty per cent, within this century New York has always been the largest city in the United States. In 1800 it had 60,515 inhabitants; in 1830 it had 197,112; in 1860 it had 805,568, and in 1890 it

had 1,515,301. In the latter year Chicago had 1,099,850, and Philadelphia 1,046,964. In 1854 Philadelphia, which had 407,700 inhabitants, absorbed its outlying populous "Liberties," and jumped to 565,529 in 1860. Chicago, which in 1880 had 503,185 inhabitants, has within a few years absorbed her suburbs, thus rising to over a million in 1890, and increasing rapidly in the three years since.

In so far as mere bigness is creditable, New York should have the credit of her outlying dependencies. In the Report of the Tenth Census, vol. xviii, page 531, "the metropolis" is assumed to include New York, Brooklyn, Jersey City, Hoboken, and Newark, with a population of 2,061,191. These five cities now number 2,710,125, constituting the second largest community in Christendom; the largest being London, with over 5,000,000, also made up of many elements which were recently independent.

There has been much discussion of the cause of the tendency of our people to gather into cities, and it has been regarded as an index of the degeneracy of the times. May it not be rather an outgrowth of changed conditions? The tendency of the race has always been gregarious. Formerly our people contented itself on its farms and in its villages because it knew no other condition. Traveling was difficult, slow, costly, and therefore unusual. After the introduction of steam this condition changed rapidly: traveling became the rule rather than the exception. The railroad, the telegraph, and the newspaper have now made the whole people familiar with the attractions and the real or supposed advantages of urban conditions, and it is not to be considered strange that so many have abandoned the hard and solitary life of the country in the hope that they might find in the town more agreeable social conditions and better opportunities for advancement. Whether this movement is desirable or deplorable, it is going on at a constantly increasing rate; and the more rapid growth of the cities than of the country at large is a fact that must be accepted, and must be considered in reference to its effect on the individual and on the body politic. It certainly concerns those who have the regulation of our cities to provide for the exigencies of their rapid growth.

Whether this growth is to be considered advantageous or otherwise must depend much on the point of view and on the ability of the city to assimilate its population without a deterioration of average quality. The true glory of a city lies not in the number of its people but in the degree of its civilization. Better, of course, a small town where the population is prosperous and

well behaved than a large one where crime and poverty have grown beyond the power of control. Mere size is not an advantage; it may prove a grave disadvantage, for the vicious and the improvident are most apt to congregate in the larger and denser communities. It is, after all, a question of government, and in this it must be confessed that improvement is much needed. Radical changes, however desirable, can not be suddenly achieved. That radical changes are desirable can not be denied.

We have fallen into the universal habit of considering the government of the city as being allied to the government of the State and of the country at large, and its control has quite naturally fallen into the same hands—that is, into the hands of political parties—so that practically it is impossible to have a vital question of municipal control decided on its merits. It is decided almost invariably with reference to the effect that party success or failure in the city may have on party control of the government of the State and of the government of the country. An election for mayor is usually determined with a view not so much to the influence of the individual candidate on the interests of the city as to the effect of the issue of the election on the success of the party in the State or in the nation. For example, at a recent mayoralty election in New York a vast number voted for the successful candidate, in spite of their disapproval of him and of the local organization by which he had been nominated, because of their fear that the failure of his party then might lead to its failure in the national election, in which it was committed to a policy which these voters regarded as of paramount importance. So long as this merging of municipal interests with State and national interests is allowed to continue, so long must the government of cities be controlled by considerations in which, as cities, they have only a secondary concern, their more vital interests being relegated to a subordinate position.

The wiser course would seem to be to regard the controlling of city affairs not in the light of government in the sense in which the control of national affairs is government, but rather as a matter of direction and control corresponding to what we see in the case of a great business corporation. A city should be regarded as such a corporation; in which the chief officer has duties and responsibilities corresponding to those of the president of a company; its council exercising the functions of the board of directors; and the heads of departments having duties analogous to those of the chiefs of the different branches of the management

of a railroad, of the conduct of manufacturing corporations, etc. Every officer, from mayor to messenger, should be elected or appointed to his position, not because he is a Democrat nor because he is a Republican, but because he is qualified to perform the duties assigned to him in the best interest of the public at large, who are, in effect, the stockholders of the corporation. Their dividends are received—not in cash payments, but in the largest practical return from the amount they pay in as taxes—in the form of good service, good schools, clean streets, pure and cheap water, perfect sewerage, and protection against fire and against crime. In this respect we are far behind the cities of Great Britain and of the continent of Europe, where, save for the attempted intrusion of socialism, considerations of general politics are mostly set aside. Even socialism has not, thus far, suggested in Europe the destructive methods that are followed as a matter of course with us. In Paris, for example, those of the salaried officers of the executive departments who are old enough have held their positions and have performed their duties undisturbed under the Kingdom, the Second Empire, the Commune, and the Republic. Only recently have even the most radical republicans of France attempted to follow our example and to displace such officers for political reasons.

It will be useful for other considerations than those referred to above to give attention here to other methods of city government than those of our own country. Perhaps the most striking, and in some respects the most instructive example, as well. because of what is not applicable here as of what is applicable, is to be found in the case of Berlin, which is, on the whole, the best regulated and best governed city of the world. This city is nearly as large as New York, and is growing with nearly as great rapidity. It has about 350,000 dwellings, these being mainly apartments in large buildings. It has been practically entirely renovated and recreated as a modern city within the past twenty years. Its police force, which is excellent, is under the control not of the city—which, however, pays its cost—but of the state. In all other respects the town is self-governing. A critical study of its municipal government, made by Sylvester Baxter, was published in the Bulletin of the Essex Institute (Massachusetts), 1889. The following account is condensed mainly from that essay and papers constituting its appendix, and from a communication to the New York Evening Post made in the same year:

The broad basis of the government is a Municipal Assembly

composed of one hundred and twenty-six members, representing the one hundred and twenty-six wards of the city. Of these at least one half must be house owners; two brothers, or father and son, can not sit at the same time. The members are chosen for six years, one third retiring every two years, at the biennial elections. The long terms give the members experience, and a large majority of old members remain in office, insuring the management of affairs by persons thoroughly conversant with municipal business. This Assembly directly represents the people, and from it proceed all other branches of the government. It has absolute control of finances. As a body it has no executive functions, but its individual members exercise such functions in association with other branches of the government. The Assembly chooses the magistracy or upper branch, which is composed of a mayor and thirty-two aldermen; of these latter, fifteen are salaried and seventeen are honorary members.

The mayor is chosen for twelve years. His salary is about $7,500, equal in purchasing power to about $10,000 here. "It is a post of the highest honor, and may be considered equivalent to a life position; for when there is a vacancy in this office in a large German city it is customary for the authorities to survey the field throughout the country, and select from the mayors of other cities some man of the highest qualifications for executive and general business efficiency; and the person thus agreed upon can usually make his own conditions and be sure of re-election when his term expires, if he does not choose to retire upon a liberal pension. One Mayor of Berlin, when chosen, refused to accept the position unless certain objectionable state laws were repealed, and the Government was prevailed upon by the city authorities to take such action. The present Mayor of Berlin was, when chosen, mayor of the large city of Breslau. The mayor has general direction of the Board of Aldermen, and is almost absolute in the disposal of city business."

The salaried aldermen are elected for twelve years, with special regard to their qualifications for the departments over which they are to rule. The offices are attractive to the best class of men who have received the necessary training in the civil service. It is usual to re-elect these men on the expiration of their terms, unless they choose to retire on their pensions. These fifteen are the deputy mayor, two legal advisers, the city treasurer, two school councilors, two architects, and seven aldermen without special title, who may be assigned to such positions as they

are deemed most fit to occupy. They correspond to the heads of our various department commissions, but they are also regular members of the Board of Aldermen, where they take part in the deliberations. The unpaid aldermen are chosen for six years, and are from the higher class of citizens, mainly from members of the Assembly distinguished by years of efficient service. Their duties are the same as those of the salaried aldermen and their positions are esteemed of great honor. They are usually re-elected, and remain for life if they choose. Under this system the election of an incompetent member would be difficult. Prof. Gneist calls this board "the soul of the government of the city."

The election of the members of the Municipal Assembly is peculiar. The voters are divided into three classes, according to the amount of taxes they pay. In the first class are the heaviest taxpayers, who pay one third of the entire levy; those of the second pay the next third; and the third class comprises all the rest of the taxpayers. Each of these classes chooses one third of the Assembly who are to be voted for at an election. Thus the majority of the Assembly is chosen by a minority of the voters, but, recurring to the illustration of a stock company, by the holders of a majority of the stock. At a recent election there were about 3,000 voters in the first class, 16,000 in the second, and 166,000 in the third.

The two chambers are supplemented by a body of seventy "citizen deputies," selected by the Assembly from distinguished citizens. They serve on general committees of administration, an alderman acting as chairman, and other aldermen often being leading members. The committee also includes members of the Assembly. This executive staff comprises two hundred and thirty members, honorary officials, mainly men of fortune who can afford to give their time to the city. The large staff of paid officials are appointed for life, as is the rule of the German civil service. Life appointment secures efficiency with cheapness.

The suffrage is nearly universal, all being entitled to vote who pay a "class tax" on an income of about one hundred and fifty dollars. In the national elections there is no such restriction, and the number of qualified city voters is about thirteen per cent less than the voters at national elections. "Public spirit is also nourished into a splendid growth by this system, every tenth citizen taking part in the administration of affairs, and in the city government one looks for the best and most prominent citizens among the members, and not the worst, and finds them too. For exam-

ple, there are men like Prof. Virchow, Prof. Gneist, and others from the university, and natural leaders in public life, men of world-wide reputation, and ranking as statesmen, taking their regular part in the routine of city affairs. Prof. Gneist has been a member of the city Government since 1848. To shirk these responsibilities is hardly possible for any man, even if it were desired by him, for every citizen is obliged, under penalty of a fine and a heavy increase of taxation, to accept any position to which he may be elected."

Until 1874 the state maintained the streets of Berlin, and made inadequate appropriations for them. The results were most unsatisfactory. Since the assumption of the work by the city it has been carried on with great energy, "resulting in perfect pavements, beautiful new bridges, fine public carriages, the best street railway system in Europe, an excellent water supply, and the gigantic sewerage system that now goes so far to give Berlin its character."

The poor-relief system is admirably conducted with the assistance of some sixteen hundred citizens. Only vagabonds and worthless persons are sent to the workhouse. In other cases relief is given without degrading conditions, and certain state lands are assigned to the poor for growing potatoes. This relief in 1881–'82 cost over $1,100,000. The absence of evidences of distressing poverty is notable. "The contrast between Berlin and London, in this respect, with the brutality, crime, degradation, and misery of the latter city, is almost as marked as that between Paradise and the Inferno."

The street cleaning is admirable. It is done between midnight and 8 A. M.

The school system is one of the prides of the city. It is controlled by a school board, church officers, and local committees, upon which about thirteen hundred citizens serve. Aside from the complete system of graded public schools there are about ninety private schools. These find it more and more difficult to compete with the public schools. They are under the supervision of the public-school authorities, and must conform to public standards.

"Berlin sets us a highly important example in another respect which it would be well to follow, and, indeed, improve upon. It may be laid down as a broad principle, that whatever men can do better by combined action than by working as individuals, that thing they should do, through the instrumentality of their

governmental organizations, both for considerations of economy and for the greater good resulting in broadening and improving individual character through working in unison with others for the good of all, than alone, simply for the good of self." In the case of this city, nothing is left to private or stock-company enterprise that can be properly conducted by the Government; and where the enterprise of companies is availed of, it is under conditions entirely favorable to public interest. For example:

The street railway system, which is excellent, is all in the hands of one great company. The construction and management are all that could be desired. This company is charged with the entire cost of paving the streets (in the best manner and under proper control) in which its tracks are laid. It also pays a certain percentage of its receipts to the city, the amount now reaching about $250,000 yearly. In addition to all this, in 1911 the street railways, with their entire equipment, are to become the property of the city, which will work them on its own account.

The gas works, belonging to the city, yield a profit amounting to about eighteen per cent of the entire annual municipal expenditure. The water works yield an annual profit of more than a quarter of a million dollars; and the sewerage system, from the annual charge imposed on house owners for the use of sewers, produces about the same revenue. A municipal savings bank is maintained, with thirty-nine branch offices, and with about thirteen million dollars deposits. This bank pays an interest of three and a third per cent. "There is also a municipal fire-insurance office, in which all house owners are obliged to insure." In 1882 the value of buildings insured was over five hundred million dollars, and since that time has enormously increased. "Owing to the substantial construction of the city and the excellent fire department, the annual premium is only five or six cents on one hundred dollars. Another city institution is a mortgage bank, established in the interest of the credit of real estate, issuing on varying terms mortgages at four, four and a half, and five per cent."

Party considerations to some extent govern the elections to the Assembly, but Prof. Gneist says: "The party element soon gets smoothed in the intimate deliberations of the Board of Aldermen in the great committees, and in the numerous committees of wards. These animosities of party get gradually blurred, and finally blotted out altogether, in the common toil of daily work for the interests of the community."

The full force of the foregoing account of the condition of

Berlin, created almost *de novo* within twenty years, will be understood when it is considered that the net debt of New York city is about $100,000,000, while the net debt of Berlin is less than $10,000,000; the taxes of Berlin amount to about $15,000,000, and those of New York to nearly $34,000,000. The Evening Post, in reviewing Mr. Baxter's study, says:

"What did the people of Berlin get in return for this outlay of less than one half of ours, though their city is nearly as large as ours? Our correspondent gives the reply in detail: The best police system in Europe, every street in the city being under absolute control; a plentiful supply of water at a rate below that of American cities; good, honest gas at $1.12 a thousand; well-lighted, well-paved, and scrupulously clean streets, the sidewalks as well as pavements being cleaned in the night time by the municipal authorities; better street and elevated railways than almost anywhere else in the world; and, finally, the rent-payers get houses to live in at rentals which are only a half or a third as large as those of New York, nineteen twentieths of those paid in the whole city being less than $500.

"How is all this done, with so many theorists, and even college professors, in the executive staff of the city? Simply because they conduct the city's affairs upon business principles. They so manage the gas works, which are owned by the city, that they light the city without expense, and earn a surplus of over a million dollars. They so manage the Water Department that the city has its water free, and there is a surplus of over four hundred thousand dollars. They so manage their school affairs that they have the finest public schools in the world. These are only the chief items in the result attained. There is no whisper of corruption in office, of extravagance in expenditures, no 'boodle' scandals."

How is this wonderful difference to be accounted for? By nothing else than the fact that in New York the city is governed in the interest of its rulers, who work it as a private enterprise, while Berlin is governed by its best citizens in the sole interest of its people; that in New York government is politics, and that in Berlin government is business.

Details are unimportant. Whether or not we in this country should seek what is sought in Europe, and whether we are considering the interest of large towns or of small ones, the main features of this example are of commanding consequence; they illustrate to absolute conviction the importance of treating a community not

University of Chicago, principal building.

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as a political entity to be managed by political methods and for political ends, but as an industrial institution, where the proper administration of an enforced income should secure the largest possible return in the form of public safety, comfort, education, and the best facilities for satisfactory life.

Of the government of Glasgow a careful study has been made by Albert Shaw, who contributed a paper to the Century Magazine for March, 1890, entitled "Glasgow: A Municipal Study." This constitutes another instructive example which is worthy of the careful consideration of all who are interested in municipal government, especially in those details which relate to the comfort and sanitary safety of the people.

The compactly inhabited area of Glasgow covers only 6,111 acres, less than ten square miles, with a population (in 1888) of 560,000, being an average for the whole of 91 persons per acre. The average density of one fifth of the city is 300 per acre, while many single acres average 1,000 inhabitants. Including suburbs, the total population is about 800,000. In 1750 this city had but 25,000 inhabitants, which population was trebled during the next fifty years, and in 1811 it amounted to 100,000. In the last eighty years it has doubled its population three times.

As with nearly all Scotch towns, the habit is general of living in flats in large tenement houses. "The rapid growth of the present century has given most serious reality to all the latent and lurking evils of a tenement-house system, and Glasgow has been compelled to study and apply modern remedies—indeed, to be a leader in the invention and trial of remedies—for the ills which result from the overcrowding of the poor. The regulation of house-building and occupancy; provision for domestic cleanliness; schemes of street cleaning, of garbage removal, of epidemic-disease prevention, of improved 'watching and lighting' arrangements, with a view to the lessening of crime; provision for shelter of floating population; a differentiated and adequate system of sanitary inspection; the establishment of baths and various conveniences to improve the health, comfort, and moral condition of the people—all these features of recent municipal activity may be studied to special advantage in Glasgow."

The government of the city is exercised by the Council or Grand Committee of fifty men. Each of the sixteen wards elects three members, who hold office for three years, one from each ward retiring annually; the remaining two are *ex-officio* members, one representing the merchants' organization and one the

trade guilds. Since 1858 the elective franchise is held by rate-payers on premises valued at ten pounds rental or more (where they live within the city or within seven miles of it); occupiers of houses, however small their rents, provided they have paid their poor rates; and lodgers occupying rooms worth ten pounds a year unfurnished.

Unmarried workmen are practically excluded. Women vote equally with men. The present elective body consists of about 75,000 men and nearly 15,000 women.

"The councilors of Glasgow come chiefly from the ranks of men of business, and are upright, respectable citizens. No salaries attach to city offices anywhere in the United Kingdom, and it is deemed an honor to be selected to represent one's ward. Party lines are seldom very sharply drawn in municipal elections. An efficient councilor may in general expect re-election for several terms if he is willing to serve. The seat of a satisfactory man, who asks re-election, is in the majority of cases not contested at all. No other candidate will appear, and he will be awarded the seat without the actual holding of an election. It may be said that in the sixteen wards of Glasgow it is unusual to have more than five or six contests for a seat in any one year."

"The mayor or 'provost' and ten magistrates are chosen by the councilors from their own number. All appointments are made by the Council itself. Heads of departments are selected with great care, and their places are practically permanent. In the minor appointments the responsible heads are allowed to use large liberty of suggestion, the Council ratifying such selections as are agreed upon by the departmental head and the supervising council committee. . . . The best men are selected from among the applicants, and there is little or no complaint of favoritism."

The sanitary system, which is the pride of this city, has as its ultimate authority the Medical Officer of Health, and as its executive the Sanitary Inspector. This arrangement leads to no conflict of authority, and it relieves the medical officer from the details of administrative work. "The entire force of the inspectors is at the service of the medical officer, yet he has no responsibility for their routine work." Dr. Russell, the medical officer of the city, says: "Twenty-five per cent of the inhabitants live in houses of one apartment" (or, as we should say, in apartments of one room); "forty-five per cent in houses of two apartments; sixteen per cent in houses of three apartments; six per cent in houses of four apartments; and only eight per cent in

houses of five apartments and upward." That is, 126,000 of the people of Glasgow live in single-room tenements, and 228,000 in two-room apartments.

Epidemic inspectors are constantly ferreting out contagious diseases. In 1889 they discovered 3,769, in addition to the voluntary reports of physicians of 5,230 cases. There is a corps of nuisance inspectors familiar with plumbing and the building trades, who reported 21,886 nuisances, such as defective drains, matters of water supply, accumulations of garbage, offensive ash pits, and general unwholesome conditions. There is a regulation providing for the measurement of all houses and the ticketing of those having less than 2,000 cubic feet of space. The tickets are posted on the doors, and the inspection is to prevent overcrowding, toward which there is a great tendency. The control of this matter gives occasion for night inspections, which, as the courts, halls, and stairways of all buildings are brilliantly lighted by gas by the city, are usually carried out, and which secure an admirable police control in quarters where formerly crime was rife and uncontrollable.

The description of the epidemic hospital of Glasgow is a revelation. "As now used, it has accommodations for from five hundred to six hundred patients, which can be increased to a thousand without any overcrowding of the spacious wards. A technical description of the arrangements of this establishment is not, however, compatible with the scope of my paper, and I must not digress in that direction. Thoroughly compatible, however, is a discussion of the policy of the Glasgow authorities in giving this place the semblance of a lovely village, with its trees and lawns, its playgrounds and beautiful flower gardens, with its separate and homelike private apartments instead of common dormitories for the eighty nurses, and with convalescing rooms and every convenience attached to each sick-ward—when it would have cost much less money to build a big, repulsive 'pest-house,' and inclose it with a grim wall, 'a place for sick paupers to die.' . . . After the average sojourn of six weeks at Belvidere patients are reluctant to leave, and they carry wonderful tales back to the tenement rows. The Belvidere nurses are ladies, and the city gives them such accommodations as in their arduous and necessarily secluded work they might reasonably desire."

Omitting, for lack of space, a review of the sanitary washhouses, the cleansing department, the city Trust for the improvement of tenement houses, the model tenement and lodging houses,

public baths and wash-houses, we come to the consideration of the gas supply, which was transferred from private hands to the corporation, in 1869, at a cost of $2,600,000. The management by the authorities has given perfect satisfaction to all citizens. The use of gas has greatly increased, and the price per thousand feet has been reduced year by year from one dollar and fourteen cents to sixty-six cents. "No one will claim that a private company would have made these reductions while continuing to supply a satisfactory quality of gas." Yet the department has been able to construct new works, pay interest charges and running expenses, "write off large sums every year for depreciation of works, pipes, and meters, and accumulate a sinking fund which now exceeds $1,000,000. Its total indebtedness was at the highest point in 1875, when it reached $5,330,000. The net debt is now reduced to about $2,400,000." This is, of course, more than covered by the value of the plant. The city is now supplying gas cooking stoves, either selling them at cost or renting them at moderate charges. The city recovers in rents a fair interest and depreciation charge on its investment in stoves, while at the same time increasing the market for gas.

Glasgow's experience with street railways has an especial interest for us. In 1869 two syndicates of American origin applied to Parliament for the horse-railway franchise of Glasgow. Parliament had already given the City Council the power to construct such railways. A compromise was now made between the city and the two syndicates, by which it was agreed that the city should retain the control of its streets, and that it should construct and own the lines, while the two syndicates were to unite in one company and work them on a lease. The first lines were opened in 1872, and the lease is to terminate in 1894. The company pays to the corporation the annual interest on its investment; a yearly sum for a sinking fund, large enough to clear the entire cost during the lease; a renewal fund of four per cent per annum on the investment, out of which the lines are kept in condition so that they may be restored to the city in perfect order and as good as new in 1894; and a mileage rental of $750 per street mile. It was provided that in no case should the charges exceed one penny per mile, and that longer runs likely to be used by laboring men and poor people should charge not more than one penny, and that morning and evening cars should be run for workmen at half price. The company lost money during the first five or six years, then it began to pay dividends to its stockhold-

ers. During the past twelve years it has paid dividends of from nine to eleven per cent. When the lease expires the city will be in a position to make terms still more favorable to the people, so that after 1894 these railways will yield to the municipal treasury a large income, and will not require a penny of public expenditure.

Mr. Shaw's paper closes with the following statement: "The general financial position of the municipality is excellent. Its debt is not formidably large, and most of it is potentially covered by the growing sinking funds of prosperous and productive departments. The numerous undertakings of the municipality, far from imposing heavier burdens upon the rate-payers, promise in the years to come to yield an aggregate net income of growing proportions, to the relief of direct taxation. Glasgow has shown that a broad, bold, and enlightened policy as regards all things pertaining to the health, comfort, and advancement of the masses of the citizens may be compatible with sound economy and perfect solvency."

Paris is too important a city, and its governmental and administrative features are much too complicated by the traditions of its long history, to make it possible to give here even a general *résumé* of its principal features. Its Municipal Council of eighty members has many defective features, and offers little that is instructive. Its administration is so allied in some of its elements to the administration system of the state as to make it of little value here. The details of its public work are, however, managed with great skill and wisdom, producing, though at high cost, the most perfect results.

The spirit in which its public departments are controlled, though these vary much, is sufficiently indicated by its relation to the system of gas lighting. The gas is furnished and distributed by a consolidated company with a capital of $16,800,000. The product is tested and controlled by the public authorities, who regulate all details of pipe-laying and distribution. For the right to lay its pipes the company pays the city $40,000 per annum. The pipes are laid under the sidewalks. The city receives also, in lieu of an actual tax, four cents for every ten cubic metres of gas consumed. It regulates the price to private consumers, and receives gas for its own use at about half that price, or at about cost. After paying fixed charges and applying a certain sum to its reserve fund, the company pays over $5,000,000 for dividends and interest, and all surplus profit is divided equally

between the company and the city. Its stock can not be watered or otherwise increased. At the expiration of the charter (1910) the entire plant becomes the property of the city. The city's share of the profits in 1870 was $1,000,000; in 1875, $1,600,000; in 1880, $2,500,000; and in 1882 more than $3,000,000. For several years past the city's receipts from the company have been approximately $4,000,000. In the last ten years the company has paid to the city $40,000,000. Albert Shaw says: "The inspection of gas manufacture, the testing of the quality of gas, the supervision of gas fittings in all kinds of buildings, and the management of the public lighting, belong to one of the bureaus of the Department of Public Works, and come under the general charge of an engineer in chief, who has under him a staff of nearly one hundred ordinary and assistant engineers. It is needless to say that this, like all other bureaus of the executive municipal Government, is a model of efficiency. Paris, under its intelligent operations, has been, and remains, the most beautifully illumined of all large cities."

The lighting of the city by electricity is now being undertaken in the most scientific way, its area being divided into seven sections, which are given to contractors representing several different systems. The sections all converge at a central point, where the city itself has an immense installation, and it reserves the right to lay its own wires into any of the conceded sections where it may find competition with the private undertakers advisable. The period of these concessions is short, and at their termination the administration will be in possession of such knowledge concerning the system of public and private electric lighting as to enable it to regulate the permanent disposition of this question in an economical and effective manner.

The water supply is thus far inadequate as to quantity and largely so as to quality. Great extensions of the work are now being made, with a view to distributing a supply of pure water to the amount of sixty-five gallons per head per day.

The much-lauded sewer system of Paris, to adopt the idiomatic expression, "leaves much to be desired." The sewers are really huge channels which serve an excellent purpose for the placing of water pipes, pneumatic tubes, and telegraph and telephone wires. As drains, they are, in the central and finer part of the city, exaggerated examples of the "elongated cesspool," into which the detritus of the streets is washed, forming deposits that the ordinary flow of the sewage is not able to remove. They are

constantly subjected to artificial cleansing. Until recently they received but little if any household wastes beyond such liquid flow as could be permitted to run in the street gutters, the main domestic drainage system being one of tight cesspools periodically emptied by the pneumatic process. The system is now being amended, and the admission of house drainage to the sewers is rapidly increasing.

While the sewerage generally is not to be commended, the system of sewage disposal, by irrigation on the gravelly soils along the Seine below the city, begun in a small way some twenty years ago, has increased until it now provides for about one fourth of the outflow. Arrangements are making for the disposal of the entire outflow by the same process, which has proved in all respects most satisfactory, and which constitutes one of the most important and instructive examples of sewage purification in the world—one which has had probably more influence on the extension of this method than any other.

The perfect public service of this city is not secured without great cost, the taxes amounting to twenty-five dollars for each man, woman, and child. This annual cost—one hundred and twenty-five francs—Mr. Shaw shows to be expended as follows:

"Twelve francs go to the maintenance of the police department with all its various services; three are paid for the cleansing and sprinkling of the streets; three and a half are paid for public lighting; half a franc goes for protection against fire; ten francs are expended for the maintenance of the schools; ten more go for the support of hospitals and relief of the poor; from eight to ten are spent in maintaining the ways of communication; a sum that varies greatly from year to year, but which we may assume to call five francs, is paid out on new construction of streets and means of communication; and forty francs are required to meet interest and other payments on account of the municipal debt. The expenses of the general offices and City Council, with a large salary list, and of various minor departments and services that need not be specified, easily account for the remainder of the one hundred and twenty-five francs. . . . A critical discussion of the Paris budget is not in order in a descriptive article, and I may only say that my earlier unfavorable impressions, due to figures so large in comparison with other European cities as to seem indicative of extravagance, have been in the main removed by more careful study. If Paris spends vast sums in her municipal housekeeping, she has diverse, magnificent, and permanent results to show, and her peo-

ple are, as I believe, enriched rather than impoverished by their common investments as a municipality."

We have in this country as yet nothing comparable with these foreign examples, though notable efforts have recently been made in the right direction in some of our towns. The most interesting new departure is to be found in the instance of St. Louis, where a new form of government has been in successful operation since 1876. By the charter which went into effect at that time, the municipal control is vested in a mayor, a Council consisting of a president and twelve members, all elected on a general ticket, and a House of Delegates consisting of one member from each of the twenty-eight wards, with the very important addition of what is practically a "third House," called the Board of Public Improvements, consisting of a president elected by the people on a general ticket, and five commissioners appointed by the mayor, with the approval of the Council. These are styled the Street Commissioner, the Water Commissioner, the Sewer Commissioner, the Harbor Commissioner, and the Park Commissioner. The Council and the House of Delegates constitute the Municipal Assembly. The mayor appoints a number of other officers to hold office for four years. No limit is fixed to the term of office of the five commissioners constituting the Board of Public Improvements, but its president is elected for four years. The commissioners may be at any time removed for cause by the mayor or by the Council. If a commissioner is removed by the mayor, the Council appoints his successor; if he is removed by the Council, his successor is appointed by the mayor without the concurrence of the Council. The term of office of appointed officers is made to terminate two years after the Mayor takes office, so that, except in case of vacancies occurring from natural causes or of removal by the Council, he can make no appointments to these offices until the beginning of the third year of his term. One half of the Council is elected each two years, so that when the new mayor is installed one half of this body has had two years experience of its work.

Nearly all the important expenditures of public money are under the control of the Board of Public Improvements. They prepare and recommend to the Assembly all ordinances for the opening, widening, constructing, repairing, and sprinkling of streets and for all excavations in streets; also all ordinances in connection with the construction, repairing, and maintenance of sewers, and for all work in connection with the system of water

supply, and for the improvement, repairing, and maintenance of the river front; also for the improvement and maintenance of public parks and of public buildings. With regard to street and sewer work, the charter provides that no ordinance shall be valid unless first approved by the Board of Public Improvements. No contract let by this board shall be valid unless approved by the Assembly. The Assembly can not amend ordinances prepared by the Board, nor can it increase or decrease the amount appropriated in such ordinances. Its only power is to approve or reject the recommendations of the board, and to control the contracts made by it under such ordinance.

Under this scheme the control of all public work, and by far the greater part of all public expenditures, rests in the hands of commissioners selected for their skill and competency in the departments to which they are assigned; and the result has shown that this provision secures economy, and the faithful and skillful performance of the most important public duties. Each commissioner is the responsible head of his own department; he appoints his own subordinates, subject to the approval of the mayor or of the board, and all are removable by himself at his pleasure. The board prepares ordinances relating to the letting of contracts. Contracts are in all cases awarded to the lowest bidder, whose bondsmen are held to a strict accountability. This has resulted in the formation of a body of contractors having the confidence of the commissioners and understanding their exact responsibility. Contractors who are incompetent or tricky are easily got rid of by the simple enforcement of the terms of their agreements.

In a recent paper by the Sewer Commissioner it is stated that "the public works of the city have been managed with economy and skill, and without the slightest suspicion of jobbery. City work is, in fact, as well and as honestly done as that of any private individual or corporation; so that, in cases where an option is given to the property owner to do work, such as sidewalk or alley paving, himself, or to have it done by the city at his expense, it is found to be uniformly cheaper and better to have it done by the city.

"The full control and responsibility given by the new system to each commissioner over his own department has naturally placed integrity and fitness at a premium in the appointment of subordinates, to the disregard of political and other irrelevant considerations. Each has been free to organize and manage his force with an eye single to obtaining the best work, both in

quantity and quality, and where this is done success is easy and certain.

"Another thing which has contributed much to the efficiency of the various departments has been the opportunity of the commissioners to refer doubtful points of policy to the full board for advice and counsel. Backed by the prior indorsement of the board, they are thus enabled to take with safety responsibilities which they could not otherwise do without great danger of misconstruction and consequent loss of public confidence. For a public officer must not only do right, but must also be thought to do so by the community whom he serves. In matters of doubt, the confidence of the public is more easily retained by a board than by any single man; just as a full bench of judges is stronger as against calumny than any single judge, however pure his motives can ever be. There has thus resulted for the various commissioners a great gain in the confidence of the public, with a corresponding gain in the efficiency of the several departments."

Naturally, the success of the administration of the affairs of a city under such a charter as this, as under other circumstances, depends on the skill and fidelity of public officers. The St. Louis charter seems to provide all possible safeguards, and thus far the system of government has not been so subjected to political control as to interfere materially with the successful working of the scheme. It is, so far as the writer can judge, the most complete and successful charter thus far adopted in this country. Indeed, this may be regarded almost as an isolated case of good government in American cities. As a rule, conditions exactly opposed to those here secured prevail, good government and economical and effective administration being generally subordinated to the paramount interests of national politics—national politics being used as the medium through which the control of public expenditures is retained in the hands of those with whom the management of public affairs is a business and a livelihood.

The politicians of St. Louis have by no means abandoned their efforts to control the government of the city, but the popular satisfaction with the present methods is so great that they have thus far made little headway in important matters. The operations of the Board of Public Works have remained undisturbed.

It is too early, however, even in that experiment, to say that the old-fashioned political control is forever done away with. The vast field for the employment of labor and the great number of comfortable offices incident to the carrying on of the work of a

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Fine Arts Building, World's Columbian Exposition.

city are too important to the interests of needy politicians to be wrested from their control without a long and severe struggle. The further obstacle is to be considered that the better class of the people themselves can make, or they fancy they can make, more money by attending closely to their manufacturing, commercial, and professional business than they might save by proper attention to their political business. As a rule, the actions of men are largely controlled by money considerations.

Abating nothing from our interest in the radical and necessary changes above indicated, but recognizing the faintness of the hope of securing such changes at an early day, let us turn our attention to existing conditions.

Taking a general view of municipal government, one of the most important subjects for consideration is the drawing of the line between what should be done by the public and what by private enterprise. Whatever is done, whether by the public or by private individuals and corporations, it must all be paid for by the people. As a rule, it will be found that where the government is honest and the service efficient, that which is done by the authorities costs the people less money than that effected by private enterprise; for private enterprise is not carried on with the sole nor with the chief aim of benefiting the people, but primarily with a view to making money out of the operation. For example, the water works of a town are constructed on the same general principles and at the same general expense whether owned by the town itself or owned by a company. The cost of maintenance is substantially the same, and the water as supplied to the consumer has been furnished at about the same cost in either case. There is this very marked difference: that the public supply is delivered at about the cost of production, or if a profit is realized that profit goes into the public funds for the benefit of the taxpayer (the consumer); where the works are privately owned there is apparently always a profit, generally a handsome one, and sometimes an enormous one, which is taken from the people at large for the benefit of individuals. The same is measurably true with regard to illuminating gas and electric lighting. There is no reason why all these necessary elements of municipal work may not, with proper administration, be under the firm control of the municipality. The argument is often advanced, in favor of private control, that the offices which the proper management of such works necessarily creates will be better filled under private than under public ownership. A careful investigation of these works, under

the two conditions, will hardly sustain this view. Indeed, it is surprising to see how generally municipalities, even under political control, succeed in getting faithful and competent men to fill such positions. Public office is attractive not only to the idle and mercenary, but at least equally to those who have a desire to do their duty faithfully and to achieve credit in its performance. Certainly there can be no comparison between the loss to a city from the control of such works through its own agencies and the great profit of private concerns to whom their control has been transferred. In fact, under private ownership the profits are usually so large that it is not, in practice, found worth while to enforce more faithful service from employees than is secured under ordinary municipal rule.

Precisely the same arguments that are used in the case of water works might be applied with equal force in the case of fire departments. It is no more easy to demonstrate the superiority of private enterprise in furnishing the people with a prime necessary of life like water, than to demonstrate the superiority of private enterprise in preventing the occurrence and spread of conflagrations. Cities seem to have fallen, for no special reason, into a habit of intrusting the water supply to speculators, and of retaining the extinguishing of fires in their own hands. Looking in the other direction, we find that the very important duty of transporting persons from one part of a city to another has been left entirely in the hands of private corporations. The conditions here are not especially different from those of the other items referred to, and there is much to be considered in favor of the ownership and control of street railways by the public, which owns and controls the streets themselves.

There seems to be no reason why street railways should not be enterprises of the public precisely as schools are, and with schools public control and management are universal.

When the public reaches the only sound position—that city government is not a matter of politics, but a matter of business—it is not unlikely that every department of public service, including lighting and transportation, will be regarded as an element of the business, and will be taken under systematic and competent management. The only sound argument now advanced against such a conclusion is based on the fact that public office is regarded not as a public trust but as an individual reward. When subordinate officers of all grades are appointed in the public interest rather than in their own, and when they are sure of tenure during

the satisfactory performance of their duties, of promotion according to their deserts, and of moderate pensions after a certain term of service, then will the management of our cities, large and small, be as efficient, as thorough, and as economical as are those of Glasgow and Berlin.

However, the conditions above indicated must be reached by slow and gradual progress. What chiefly concerns us now is to consider American cities as they are, and to review the methods by which the details of their work are done. It is proper here to refer again to that redeeming trait of human nature which induces the average public officer to perform his technical duties to the best of his ability in spite of the politics which gave him his place and in spite of his controlling motive, which is, to make money out of his position. For example, the present government of the city of New York, under the unrestrained control of politicians, is supposed, probably with justice, to be thoroughly corrupt. Its leading administrative officers have been appointed not because they were the best men available for their work, but because they had earned such recognition from their party leaders. In spite of this it is not to be doubted that, as a rule, these officers, especially those who are at the heads of departments and of important bureaus, are doing their work to the best of their ability. They are doing it in a very expensive way, and through the agency of men who are more useful at the ballot than at the shovel—of men who are paid a very high price for very little work. Under such conditions, all that is done is done at a wasteful cost. At the same time it is well done, and, except in the single item of street cleaning, there is, cost aside, little to criticise. Under proper control, a like result would probably be secured for one half the money.

City Government and Administration.

The government of our cities is usually vested in a mayor and a municipal body consisting of one and sometimes of two houses. The mayor sometimes has, and sometimes has not, the power of veto. When he has this power he is an effective, active element of the government; when he has not, his connection with the direct work of government is mainly a moral one. He may have much influence, but he has little actual power so far as legislation is concerned. As an administrative officer his functions are better defined and are more important. He is generally, in fact as well as in name, the executive officer of the city, having a general supervision and a more or less complete control over all its

government departments. He is usually aided and sometimes even overshadowed either by the committees of the legislative body, who have the oversight of the different departments of the administration, or by the chiefs of departments and bureaus specifically created for the management of the details of administration. He may be said to have supreme control over all departments in which he has the power of appointment, or at least of removal. Whether an administrative officer is elected or whether he is designated by the legislative branches, the extent of his control depends more upon his personal character than on his official authority. Conditions vary so greatly in different cases that it would be impossible to define any set of regulations as being distinctly "American." In fact, we seem to be thus far experimenting with old methods, and to be constantly inventing and trying new ones.

The "amendment" of city charters, especially in the older States, is constant; actuated in some cases by a determination to prevent bribery and corruption, and in others by a determination to remove restraints which political rings consider an obstruction to their money-getting schemes and to their partisan control.

In some of the newer States special charters are not provided for, and amendments with reference to particular cities are not permitted by the Constitution; all municipalities being organized under general laws providing for more or less complete organization, according to the size of the community. This is sometimes carried to an absurd extent, as in the case of Tennessee, where a full-fledged city with a mayor, legislative body, police force, and all the necessary paraphernalia of a city government, may be secured by a community only large enough to furnish the necessary officeholders. In one such city, at the time of its organization, when the other offices had been filled, there was only one citizen left to constitute the police force!

The abolition of politics from city elections; the establishing of strictly business aims and methods in the conduct of city affairs; and the performance in the sole interest of the people of every branch of the public service—these are the *sine qua non* of good municipal government. That they are attainable Berlin and Glasgow have shown; but they will never be attained here so long as party leaders, who profit by the spoils and partisan benefits of the present system, can prevent it, and these men are skillful in maintaining their supremacy. When the people themselves once fully comprehend the great benefit they will reap from the change, then, but only then, can it be effected.

Cities of over Two Hundred Thousand Population.

NEW YORK.

Latitude	40° 42′ N.
Longitude	74° 0′ W.
Altitude	0 to 282 feet.
Valuation	$1,933,518,529
Per capita	1,276
Net debt	98,581,741.12
Per capita	65.06
Tax per $100	1.83

Population :

1790..	33,131	1860..	805,658
1800..	60,515	1870..	942,292
1810..	96,373	1880..	1,206,299
1820..	123,706	1890..	1,515,301
1830..	197,112		
1840..	312,710		
1850..	515,547		

New York was founded by the Dutch, at the lower end of Manhattan Island, about 1615, when a trading fort was built there, another being built at about the same time at Albany. It became the American headquarters for the Dutch West India Company, with a capital of $2,500,000. The first Governor, Peter Minuit, arrived at the island in 1626. He assembled the natives for negotiation, and purchased the entire island of Manhattan with beads, buttons, and other trinkets of the value of about $24. In 1629 the States General of Holland sanctioned a scheme called "The Charter for Freedoms and Exemptions." This conferred the title of Patroon upon any member of the company buying from the Indians land on a navigable river in New Netherland sixteen miles on one side of the river or eight miles on both sides and extending inland indefinitely, and who founded thereon a colony of fifty adults. A few of the directors took immediate advantage of this scheme and bought immense tracts of the best land. Kiliaen Van Rensselaer, one of the original founders, bought land on the Hudson River comprising most of the counties of Albany, Rensselaer, and Columbia. Manhattan Island languished, but the development of active industry and trading stations up the river insured the future of the little town of New Amsterdam. Peter Stuyvesant, the fourth Dutch Governor, arrived early in 1647. He gave new life and stability to the colony. A census of the city was taken in 1656. The inhabitants numbered 1,000, including many negro slaves. There were about 120 houses, renting at from $14 to $100 per annum. The average price of the best city lots was $50. In 1656 one short street was paved with cobblestones, a gutter being left in the middle. In 1660 all streets most used were paved, but were without sidewalks. In 1664 a fleet under Colonel Richard Nicolls arrived in the harbor with a demand for the surrender of the province to the English, who questioned the right of the Dutch to any part of the territory.

Stuyvesant was already much perplexed by the controversy about the dividing line between New Netherlands and New England. Nicolls promised to confirm in their estate and liberty those inhabitants who should peaceably submit to English authority. The wall across the city on the present line of Wall Street, a strong defense against the Indians, was of no avail against a civilized foe, and the river fronts were defenseless. There were many English inhabitants, and these were jubilant over the arrival of the king's forces. The Governor was entreated to avoid bloodshed. "It was anguish to the stern military chieftain; he hesitated, but . . . capitulated in unspeakable sorrow."

The city now passed under English rule, and was named New York. The community was of the most mixed and incongruous character. "Eighteen languages were spoken in its streets." War afterward breaking out between the English and Dutch in the summer of 1673, a Dutch fleet appeared in the harbor and with very little ceremony recaptured the province. The demand for surrender contained these words: "We have come to take the place which is our own, and our own we will have." New York again became New Netherlands, and the city was called New Orange, which name it bore until the next year, when it reverted to the English under the Treaty of Breda, and became again New York. In the course of its early history, the city was a nest of pirates, whose industry, like that of the merchants on whom they preyed, was favored by its central position and nearness to the open sea. These were the days of Captain Kidd.

The city passed through the trials, tribulations, successes, and triumphs incident to the growth of a new town in a new land, receiving both help and hindrance from the mother country. At the outbreak of the Revolutionary War it had extended in a northerly direction to the vicinity of the present City Hall Park, with some growth as far north as Reade Street. The North Church in Fulton Street, St. George's Chapel in Beekman Street, and the Brick Church opposite the City Hall Park, were in the very outskirts. Broadway was a pleasant country road. There were fine farms and country seats over the island. The center of business was at Hanover Square. The fashionable quarters were in Wall Street and north of the Battery on the Hudson River shore. After the Declaration of Independence Washington advised the removal of noncombatants to places of safety. A British fleet lay between Sandy Hook and Staten Island. The attack was finally made by way of Long Island.

Washington evacuated the town September 7, 1776. The British entered on the 15th. "On the 21st a destructive conflagration consumed an eighth part of the city, destroying 492 houses." The British withdrew November 25, 1783. Revival of prosperity was slow, but much impetus to growth was given by the establishment of New York as the capital of the nation in 1785. Six years later Congress transferred its seat to Philadelphia.

From the re-establishment of peaceful conditions, New York prospered and grew, with a serious check from the epidemic of yellow fever in 1795, when, notwithstanding the fleeing in great numbers of the citizens to the country, 730 deaths occurred. In the summer of 1796, in a fresh-water pond where the Tombs now stands, John Fitch made his trial of a steamboat. The population at this time was nearly 60,000. There were twenty-three churches and five markets.

Another yellow-fever epidemic occurred in 1798, with 2,086 registered deaths. Thus far water had been supplied from wells. In 1799 the Manhattan Company was chartered, ostensibly to supply New York with water (from the Bronx), but with the real purpose of establishing a bank. This bank still exists, with a very small water pipe maintained to protect its charter.

In 1801 the total valuation was $21,964,037. At this time the tax levied was one mill on the dollar. In 1802 the Evening Post was founded. In 1803 the cornerstone of the City Hall was laid. There was another appalling visitation of yellow fever during this summer. In 1807 Robert Fulton made his successful experiment in steam navigation. New York now had nineteen newspapers, eight of them dailies, and in 1808 the American Academy of Fine Arts was incorporated.

The War of 1812 brought serious trouble and apprehension, and after the burning of Washington, in 1814, the lower end of Manhattan Island became one vast military camp. Specie payment was suspended and was not resumed for three years. It was at this time that Fort Richmond was built at the Narrows, and the works on Governor's and Bedloe's Islands were made formidable. Castle Garden was erected, and Harlem Heights were fortified, one bastion still standing in the upper end of Central Park. The population was now over 90,000, including 1,000 slaves. Business revived and the era was one of great prosperity. De Witt Clinton, mayor of the city, the master spirit of the Erie Canal project, pushed forward the opening of new streets. Work on the canal was begun July 4, 1817, and it was completed by the

incessant labor of more than eight years. New York paid nearly $10,000,000 of the cost. During this period she collected and paid into the treasury of the nation, customhouse and other dues amounting to more than $64,000,000.

In 1822 yellow fever again broke out and raged furiously. For weeks business was entirely suspended. A high board fence closed all the infected streets below the City Hall. Banks and other offices were, during the pestilence, removed to Greenwich village.

The water of Lake Erie was admitted to the canal on the 26th of October, 1825. The news was signaled to New York in one hour and thirty minutes by the discharge of cannon placed at intervals along the route. Canal boats, starting with the first flow, reached New York November 4th. Thomas Jefferson said, "This great river will immortalize the authorities of New York and bless their descendants with wealth and prosperity." It is this "great river," more than any other thing within the control of man, that caused New York to become what she had become when the railway and the ocean steamer took up the burden of her development.

Gas was introduced in 1825. The year 1831 was made notable by the beginning of a horse railroad to Harlem; this was completed in 1833. In 1832 over 3,000 persons died of Asiatic cholera. In 1835 occurred the great fire, burning nearly 700 buildings, largely of the most important character, sweeping over thirteen acres, and destroying property valued at $20,000,000. This fire was the direct result of a water famine. In 1837 the great financial panic occurred. On the 10th of May specie payment was suspended, to be resumed the next year. The Croton Aqueduct was completed in 1845 at a cost of $9,000,000. Then followed the war with Mexico, and the discovery of gold in California in 1849. After this there was a period of great prosperity, with a decided movement northward of the resident portions of the city, which continued until the financial panic of 1857; this was followed, four years later, by the outbreak of the civil war with its depressing influences, followed by an era of prosperity and then of speculation and disaster, bringing us down to a period with which all are familiar.

Within a few years New York has been enlarged by taking in the southerly end of Westchester County. But this section has no more natural relation to the community on Manhattan Island than have the districts lying across the East River and west of the Hudson, whose growth, like that of the added district, is

directly due to the city as developed within the limits of the island.

Anything like an adequate description of this great town would be quite beyond the limits of this paper. It is worth while, however, to correct one widespread popular error concerning it. It is universally regarded as a very narrow city "squeezed in between two rivers." In fact, its average width is more than two miles, which is equal to the distance between the Delaware and the Schuylkill in Philadelphia, and is one third more than the length of Boston from the foot of Hanover Street to the corner of Arlington and Boylston Streets. It is narrow socially considered, not otherwise. "Society" confines itself mainly to the district between Lexington Avenue and Sixth Avenue, which are less than half a mile apart. Some of its parts—as, for example, the district east of the Bowery—are among the most densely populated areas of Christendom, while within the mile north of Fourteenth Street and west of Sixth Avenue there are nearly twenty miles of streets running to the river, occupied with the comfortable and even elegant residences of prosperous families.

As to its government, New York has been the subject of infinite experiment, there having been almost constant amendments to its charter during the past fifty years. It is not too much to say that there has been a continuous effort to govern it through the State Legislature, made up largely of country members who are utterly without a proper conception of the requirements of municipal management. At present it would seem as though there was little ground for hoping that it will emulate Berlin and other foreign towns in the matter of local government. Without adopting the sharp criticisms to which its municipal rulers have been subjected, it may be said that it is ruled by men with whom government is not a matter of pure patriotism. They are politicians who are not without an eye to their own personal advancement and profit.

Under the present charter the mayor has very large powers. He has absolute control of appointment and removal of heads of departments and many minor officers without reference to the Board of Aldermen. Under the earlier charters, when these appointments depended on the approval of the aldermen, the condition was no better, if not, indeed, worse. So long as politicians hold their control over the ignorant and criminal vote of the city, and so long as the better class of citizens retain their present absolute indifference in the matter, New York must continue to be what it now is—by far the worst governed great city in the

world. The debt is large, taxes are onerous, and the municipal service, save in the important departments of Public Works and Health, and in some respects the Police and Fire Departments, is generally ineffective. This city offers little that can serve as a valuable example to others. Even the best features of its government, and those producing the most satisfactory results, are much less effective and useful than they would be under the administration of honest and efficient officials. The contrast between good government and bad government, suggested by a comparison of Berlin and New York, which are of about the same size, constitutes a perfect justification for this criticism. It would be useless to attempt thorough reform by any change of system and charter. The difficulty lies in the fact that those citizens who have the most at stake, and who, if they would combine, might assume control, are easily induced by their leaders in the national political parties to "vote the straight ticket" and leave the corrupt and ignorant vote to combine for the continuance of present conditions.

Fortunately, even those who rule the city for their own honor and emolument have sufficient practical sense to give the people some obvious return for the onerous taxation. It is to this intelligence on the part of Tammany and its allies that the city owes what is good in the various features of its administration.

Streets.—In the city proper there were, in 1893, about 450 miles of streets, 374 of which were paved—313 with stone blocks, 40 with asphalt, and 21 with Telford Macadam. But three eighths of a mile of cobblestone pavement is left in the city. Wooden pavements had all been removed, and all gravel streets had been macadamized. The cost per square yard had been, for stone blocks, from $2.50 to $3.37; Telford Macadam, $1.75 to $2.00; and asphalt, from $3.15 to $4.15. The average cost of keeping block pavements in repair was estimated at $1,000 per mile per annum.

There were in 1890 143.86 miles of horse and cable railroads, with 2,529 cars and 15,451 horses and mules, carrying annually over 255,000,000 passengers.

The elevated railroads start from the Battery and run to Harlem River, two going up Second and Third Avenues and two up Sixth and Ninth Avenues, the Sixth Avenue line connecting with the Ninth on Fifty-third Street. The total length is about thirty-six miles. The cost of these lines was given as over $40,000,000, and the average traffic in 1890 was 519,000 passengers per day. For the year ending September 30, 1893, the daily average was 601,701.

Water Works.—The Croton Water Works belong to the city, and cost (1893) about $67,500,000. Water is brought through an aqueduct of masonry forty miles long, with an average diameter of eight feet, and a fall of thirteen inches to the mile. The capacity is 105,000,000 gallons per day—about equal to the present daily consumption. A new aqueduct, with a capacity of 250,000,000 gallons, has just been brought into use, and efforts are now being made to establish storage basins in the Croton reservoir of a capacity to justify this service. The flow is mainly delivered into reservoirs in Central Park, of which the full line is one hundred and fifteen feet above tide—high enough for a gravity supply to most of the city.

Parks and Pleasure Grounds.—The total area of all parks is a little more than a thousand acres. The largest and most important is Central Park, lying between Fifty-ninth and One Hundred and Tenth Streets and Fifth and Eighth Avenues, covering an area of 862 acres. It is a perfect parallelogram, about two and a half miles long and half a mile wide. It was laid out and ornamented in accordance with plans designed by Messrs. Frederick Law Olmsted and Calvert Vaux. It is not only the finest artificial pleasure ground in this country, but it compares favorably with the best of those in Europe. It is maintained in its beautiful and useful condition by a constant struggle with those who would devote its finest parts to parade grounds, trotting courses, zoölogical gardens, and other inappropriate uses.

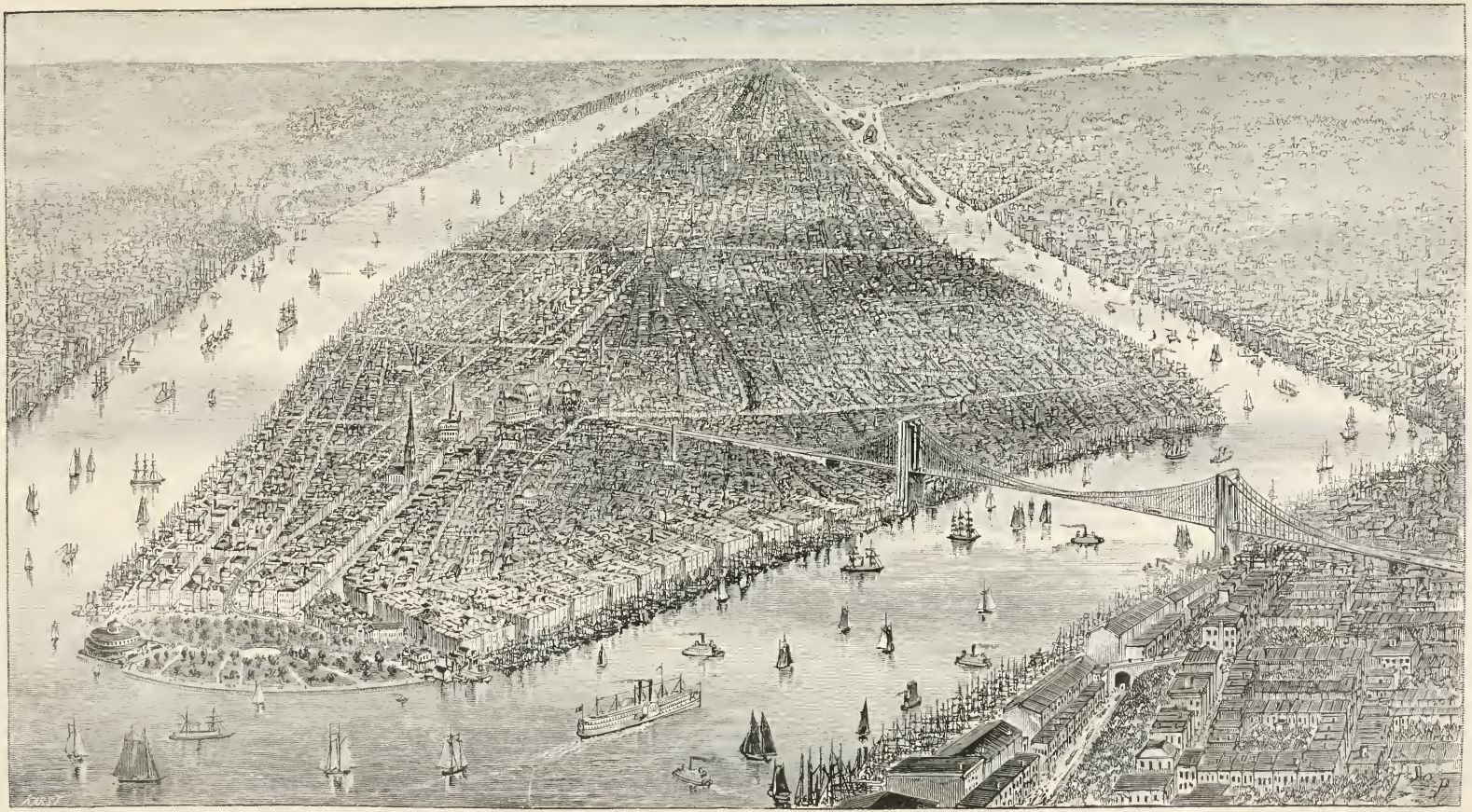
Central Park is supplemented by Riverside Park, between Riverside Avenue and the Hudson River, from Seventy-second Street to One Hundred and Thirtieth Street, and Morningside Park, on the rugged hillside running from East of Ninth Avenue, on One Hundred and Tenth Street, to Tenth Avenue and One Hundred and Twenty-third Street. There is also a fine park of twenty acres on the river slope at High Bridge, and there are a few minor useful squares in other parts of the city. The Battery, at the southerly end of the city, though not large, is a beautiful esplanade overlooking the bay, and but for the encroachments of the elevated railroads would be in all respects most admirable.

Drainage.—Manhattan Island had no important elevations in its natural topography below Twenty-third Street. Its irregularities have been mainly removed as far as Central Park, and for some distance northward on each side of the park. So far as the rectangular system of streets is laid out, it will in time all be brought to uniform and easy grades. But the rocky ridge ex-

tending from Eighty-sixth Street to Two Hundred and Thirteenth Street, Spuyten Duyvil, will have to be subjected to other treatment.

So far as the grading of streets has been carried, the drainage system is either complete or is under construction. There is still a good deal of bad old work in sections of the city below Forty-second Street, and especially below Fourteenth Street; but the new work, which is pretty nearly universal above Fourteenth Street, and which covers a large part of the lower portion of the city, is on the whole excellent, the good work having been first constructed by the Croton Aqueduct Department, and later by the well-managed sewerage bureau of the Department of Public Works. The existing work in 1893 included 413 miles of sewers, 20.50 miles of culverts, and 5,435 receiving basins. Prior to the organization of the Croton Aqueduct Department, in 1849, there were 69.36 miles of sewers. The Croton Aqueduct Department constructed, prior to the organization of the Department of Public Works in 1870, 182.33 miles. These lengths did not include many miles of sewers and other works rebuilt to supply the places of those destroyed or fallen to pieces. Formerly the sewers delivered along the shore at the bulkhead line in water protected from the tidal movement by the projecting piers. This gave a most unsavory and objectionable character to the whole shore of the city, and led to the devising of innumerable schemes for sewage disposal, including one for the delivery of the whole flood on to the sandy land of Long Island.

The condition resulting from such discharge down to 1880 was on many parts of the shore nearly unbearable. There were no less than eighty outlet sewers discharging their contents into the river below Fourteenth Street. They drained from one acre to three hundred and sixty acres each. Much progress has been made in correcting this defect by the construction of intercepting sewers, greatly reducing the number of outlets, and making the delivery at the ends of the piers into the rapid tidal flow. One such improvement consisted of a continuous stretch of three thousand feet on the west shore, between Canal and Tenth Streets, in conjunction with the improvement of the water front, West Street being made two hundred and fifty feet wide, with a river wall; and the building of twelve piers, from fifty to eighty feet wide and from five hundred to eight hundred feet long. It is believed that this delivery into the active current will entirely solve the sewage disposal problem for all time. Its effectiveness is due



General view of New York.

to the peculiar condition of the tides of New York harbor. Hudson River, as it flows over the dam at Cohoes, is an unimportant stream, and it receives no tributaries of much consequence throughout its length, its watershed being relatively narrow. It is in reality, as far up as Albany, an arm of the sea, subject to a considerable tidal movement for its whole length. It thus constitutes a vast tidal storage basin. The harbor receives its tidal supply at Sandy Hook and through Hell Gate, but Hell Gate is the outlet of the vast funnel-shaped basin of Long Island Sound. As the tidal wave of the Atlantic moves westward it reaches the harbor, by way of Sandy Hook, between three and four hours before the Sound tide enters. Owing to the long course and frictional resistance of Long Island Sound, and to the narrowing channel from Montauk Point to Throg's Neck, the Sound tide reaches Hell Gate, as stated, three or four hours after the tide coming in at Sandy Hook attains the same point. Therefore, at that point, the Sound tide is high when the ocean tide has been flowing out for some hours and is approaching its lowest point. The height of the mean tide at Sandy Hook is about four feet, while the height of the Sound tide at Throg's Neck, owing to the funnel-like form of the water way, is about seven feet. At certain stages of the tide, were a barrier built across the East River at Hell Gate, there would be a difference of elevation on its two sides of about five feet. The effect of this condition of the tides is, that vastly more water flows in through Hell Gate than ever flows out by that channel. The additional volume thus contributed to the waters of the harbor not only washes the shores of the East River thoroughly, but it fills the Hudson River and the lower bay as well. The outflow of this accumulation, when the tide is falling at Sandy Hook, not only maintains the deep channel there, but carries with it the sewage outflow of the city. The floods so abundantly poured in at Hell Gate subject the harbor, twice a day, to a cleansing circulation, and to a relatively complete renewal of its water. There is no better evidence of the effectiveness of this purification than the clear water of the public baths at the Battery, where, with a tidal movement due only to the inflow and outflow at Sandy Hook, the accumulation of sewage would be very great.

Municipal Cleansing.—One of the most serious problems with which the authorities of New York have to contend is the proper cleansing of the streets. It was stated in 1880 that a "thorough

overhauling of the system now in use seems to be inevitable." The system has been overhauled and reconstructed, but the result seems thus far not to have been materially changed. During the past two or three years several different heads have been appointed to the street-cleaning department, but they have been unable to perform the duties successfully, with a voter at one end of the stick and a broom-head at the other. There is no great city in Europe where anything approaching the filthy condition of New York streets would be tolerated for a moment, and it is not worth while to give space to an account of the failure of repeated trials to overcome the difficulty by political agencies. The Legislature of New York, at its session of 1892, passed an enactment from which good results may be expected. Owing to the persistent and intelligent efforts of a woman who took the matter in hand, a system is now to be established in accordance with the recommendation of a board of experts, who experimented with various methods during 1891. The city is to be divided into districts and subdistricts under officers responsible for their own bailiwicks. All are responsible to the head of the department. The division extends to sub-districts so small as to be kept clean by the work of a single man. These men are to be appointed for their physical capacity rather than for their voting power, are to constitute a branch of the registered civil service, and are to be uniformed, so that the volunteer inspection of citizens may be effective. Each man will be held responsible for the condition of the streets assigned to him, and there can be little doubt that vast improvement will result, if the politicians allow the scheme to be carried out in good faith.

Police.—The total police force in 1893 numbered 3,865 men. They are in some respects an admirable body, and the more obvious portion of their duty is well performed. They are charged with winking at the commission of certain violations of the law, notably in the matter of illegal liquor-selling, gambling, etc. An effort is now being made to abate this evil, and the appointment of Inspector Byrnes to the superintendence of the force gives good ground for hope in the matter.

The total expenditures on account of the police force in 1893 amounted to about $3,327,000.

Fire Department.—The total force of this department in 1893 was 1,067, with 94 steam fire engines, 112 hose tenders, 39 hook and ladder trucks, 130 chemical extinguishers, etc. The department has about 5,000 telegraph poles, 1,414 miles of wire, and 1,239 street

alarm boxes. From 1866 to 1890 the aggregate loss by fire amounted to $55,142,777. The discipline and service and the general efficiency of the department are all that could be desired.

Finance.—The net funded debt of New York, December 31, 1890, after deducting sinking fund, was $98,663,072.

Manufactures.—New York is the greatest manufacturing city in the country. In 1890 it had 25,403 manufacturing establishments, with a capital of $426,118,272. They employed 354,291 hands; the wages paid amounted to $230,102,167; the raw material cost $366,422,722; the value of products was $777,222,721; the average capital of all establishments was about $16,775; the average wages $650, and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $24,489.

CHICAGO, ILL.

Latitude	41° 54′ N.	Population:	
Longitude	87° 38′ W.	1840	4,470
Altitude	582 to 600 feet.	1850	29,963
Valuation	$243,732,138	1860	112,172
Per capita	221.60	1870	298,977
Net debt	18,476,450	1880	503,185
Per capita	16.80	1890	1,099,850
Tax per $100..(average)	7.34	1892.....(estimated)	1,500,000

Chicago, which in 1840 had less than 5,000 inhabitants, and in 1880 about half a million, showed by the census of 1890 a population of more than one million—a little more than that of Philadelphia, which had previously held the second rank in this respect.

About sixty years since the site of this city was a low prairie, divided by a sluggish stream known as Chicago River. It contained only Fort Dearborn, an Indian trading house, and a few scattered habitations. It probably gained its first importance from the fact that it was at the mouth of a continuous water way, with the exception of a short portage, from Lake Michigan to the Mississippi River. Fort Dearborn was built in 1804. It was evacuated on August 5, 1812, as being in danger because of the war with England. It was dismantled and burned by Indians the next day, and was rebuilt in 1816. In 1814 President Madison recommended a ship canal from the lake to the Illinois River. In 1821 a Government survey was made, with a division of the land into sections. In 1822 a Government survey was granted for the canal. In 1827 the United States granted to Illinois each alternate

section of land for five miles on either side of the contemplated canal to aid in its construction. In 1830 the Canal Commissioners laid out the original town of Chicago. In 1831 Congress made the first appropriation for improving the harbor. At that time the total tax was $149.25. In 1833 the town was organized, having twenty-eight voters. In 1836 ground was broken for the canal. In 1837 Chicago was chartered as a city, 706 votes being cast for mayor. From 1837 to 1842 there was a great depreciation in the value of property, work on the canal was stopped, and the State suspended the payment of interest on its debt. In 1848 the canal was opened. From that time the growth of the city in population, wealth, and prosperity has been most rapid. The great growth began with the extension of the network of railroads centering here, which began with the construction of a few miles with strap rail in 1847. The Michigan Southern, the Michigan Central, and the Illinois Central were opened in 1852.

Much of the city was built on ground lower than the prairie, some of it only a few feet above the river. When drainage became necessary, there was not room enough beneath the pavement and above the lake for sewers. It was decided that the whole city should be raised. A wall was built on each curb line, to support the curbstones. The space between was filled with ashes, street dirt, building waste, and earth. Sidewalks were bridged with plank, and the streets were thus "improved." Then came the buildings. Vast storehouses, hotels, business houses, and residences were lifted from four to six feet, and even ten feet, without serious interruption to their business. Horse-car tracks, lamp posts, hydrants, and shade trees were elevated to the new grade. The streets were in a horrible condition, pavements requiring to be relaid repeatedly. This transformation stage was not yet entirely passed at the date of the tenth census (1880).

The severest test to which the city has been subjected was that of the fire of 1871, the most destructive fire of modern times. There had been no rain for a long time, and the conflagration raged from Sunday night until Tuesday afternoon. The area burned was three and a half square miles. The destruction amounted to two hundred million dollars, and fifty-seven insurance companies were made insolvent.

In 1890 Chicago covered an area of 102,765 acres, 16,384 acres being in the streets, which had a total length of two thousand and forty-eight miles. Of these, six hundred and twenty-nine miles were paved: three hundred and forty-three miles with wood, two

hundred and six miles with macadam, forty miles with gravel, twenty-one miles with stone blocks, eight miles with asphalt, and eleven miles with cinders, cobblestones, and sundry other materials.

The horse and cable railways had a total length of three hundred and ninety miles; the total number of passengers carried during the year being 180,326,470. No mention is made in the census report of 1880 of cable roads, while that of 1890 reports more than thirty-four miles then in use. These and electric roads are rapidly extending. There were two tunnels under the river, giving an unobstructed passage, one being between the south and west divisions and one between the south and north divisions. There were also thirty-two swing bridges over the river.

The water supply of the city has always been taken from Lake Michigan. In 1840 a chartered company began supplying the city, having a reservoir at the crossing of Lake Street and Michigan Avenue, and pumping its water through an iron pipe extending about one hundred and fifty feet into the lake. The distribution was through "large conduits"; the main was four inches in diameter, and the minor branches three inches in diameter. After about 1860, the difficulty of obtaining pure water from the lake, while pouring the filth of the city into it, began to be evident. This was finally though only temporarily overcome by carrying the intake, by means of a tunnel, to a point two miles from the shore. The water way of this tunnel is five feet in diameter. The growth of the city soon rendered another tunnel necessary, and one was built parallel to and about fifty feet away from the first. It is seven feet in diameter.

Complaint as to the quality of the water is now frequent, the floods of the Chicago River carrying a vast amount of accumulated filth into the lake, and under favorable conditions fouling it beyond the cribs at which the tunnels find their intake. A project of the greatest magnitude and of far-reaching effect is now being put in execution for opening a sufficient water way to establish a permanent flow through the Chicago River from the lake to the Illinois River and thence to the Mississippi River, the channel being made large enough to carry a volume of lake water that will so dilute the sewage that it will not be noticeable along the route, and incidentally to furnish a water-way for the largest lake vessels from Chicago to the gulf. Some idea of the immensity of this undertaking may be gained from a recent advertisement for bids for removing more than eleven million cubic yards of rock from one of the sections of the proposed canal.

The total cost of the water works to 1892 was $19,061,268; the average amount of water pumped per day was 194,617,704 gallons, and the average cost per million gallons for each foot of elevation $5^{42}/_{100}$ cents. The total expense, not including interest and sinking fund, was $2,118,700.

The public park system in Chicago comprised nearly 2,000 acres, 1,870 acres being in six large parks and the remainder in public squares and places. The park scheme also provides for more than twenty miles of parkways from 200 to 250 feet wide; also seven miles of ordinary streets, under the same management with the park, and specially fitted for park travel, all general traffic being prohibited. The larger parks are as follows: Lincoln Park, 250 acres, two miles north; Humboldt Park, 200 acres; Central Park, 285 acres; Douglas Park, 180 acres. These latter are in the west district, about five miles from the lake and about one and a half mile apart. Jackson Park, 593 acres, where the Columbian Exposition has been held, is six and a half miles south of the Court House. Connected with this, by a pleasure-way 726 feet wide and having an area of ninety acres, is West Park, with an area of 372 acres.

The sewerage of Chicago, as originally planned, is constructed on the general principle of laying a main sewer in each alternate street leading toward the river, and draining the intermediate and cross streets to these by short laterals on both sides. In some instances two or more sewers, when they near the river, unite at a single outfall, but these are exceptions not interfering with the general uniformity of design. Those portions which drain into the lake have their sewers arranged on the same plan, save that they are collected into intercepting lines, there being only three outfalls into the lake. The sewers are circular, and are from one to six feet in diameter, those under two feet being of pipe and the larger ones of brick. The total length of the sewers in use in 1890 was 525 miles. As the sewers are necessarily laid on flat grades, they accumulate much deposit, and flushing and cleaning are much more important elements of the work in this city than elsewhere. The total cost of cleaning was about $42,800 per year.

Concerning house drainage, Chicago has a provision which, so far as the writer knows, is unique. The ordinance forbids the discharge of kitchen or laundry slops directly to the sewers, requiring a grease trap to be constructed to receive such wastes, like a tight cesspool with an overflow to the sewer. This may be

an advantage so far as the cleansing of the sewers is concerned, but it is certainly a very great disadvantage from a sanitary point of view, every house being compelled to maintain a foul cesspool, which is often inside of its foundation walls.

In 1890 Chicago had 9,974 manufacturing establishments, with a capital of $359,337,598; they employed an average of 210,108 hands; the wages paid amounted to $123,806,501; the raw materials cost $408,876,887; the value of products was $663,653,298. The average capital of all establishments was about $36,028; the average wages, $589; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $55,669.

Chicago had so long been recognized as the very focus of material enterprise and prosperity, while its intellectual and artistic development had made so much less impression on the country, that its ambition to become the site of the Columbian Quadrennial Exposition caused surprise at the East. When it was fully decided that the Fair should be held there, there was a widespread feeling of uncertainty as to the result. It was quite generally thought that there would be gathered together a wonderful exhibition of the evidences of material wealth and development, but that the artistic features of the show would be hardly more than rudimentary. The final achievement has literally astonished the world, and has reversed all its preconceptions. The material side of the display has equaled public anticipation, it is true, but this has been thrown quite into the shade by the really unprecedented artistic completeness and beauty of the buildings and grounds. It is not too much to say that the world has never before seen such a combination of majestic architecture, architectural sculpture, and grand and appropriate setting as has been created at Jackson Park by a city which began its life sixty years ago, and which was almost completely destroyed by fire twenty-two years ago.

While the "exhibits" in both art and industry are, as a whole, all that could have been desired, and more than could have been expected, and are full of interest and instruction for the people, it is the outward aspect of the Fair—its artistic beauty and grandeur—that have appealed most strongly to the millions of visitors; and these will enrich their whole lives with its memories.

The total cost of the Exposition has been, by the latest estimates, $25,540,537.85, of which $18,413,297.53 were for organiza-

tion and construction, and $7,127,240.32 for maintenance. There has been returned $10,626,330.76 for admissions and $3,699,581.43 for concessions, etc.

The United States contributed $2,500,000, to be paid in a special silver coin minted for that purpose, but of this amount $570,880 was withheld, making the actual contribution of the Government $1,929,120.

The cost of the Fair to the city of Chicago has been $5,000,000, and her money has been well spent. The total number of paid admissions to the grounds was 21,477,212.

PHILADELPHIA, PA.

Latitude	39° 57′ N.	Population:			
Longitude	75° 9′ W.	1790..	28,522	1860..	565,529
Altitude	2 to 120 feet.	1800..	41,220	1870..	674,022
Valuation	$752,763,382	1810..	53,722	1880..	847,170
Per capita	719	1820..	63,802	1890..	1,046,694
Net debt	27,160,455.62	1830..	80,462		
Per capita	25.94	1840..	93,665		
Tax per $100	1.85	1850..	121,376		

Philadelphia, by the census of 1890, had a population of more than one million—only a little exceeded by Chicago.

Hendrik Hudson's ship, the Half Moon, was the first to enter the mouth of the river on which Philadelphia stands. The Dutch Government took possession of the whole present territory of New Jersey, and called the river bounding it the Zuydt, or South River. In 1623 they built a fort on the Jersey shore about three miles from the present city. In 1637 the river was visited by Swedes. They built a number of forts on both sides of the river, which they called "New Sweden-land Stream." The country generally was called New Sweden. Lord Delawarr, making an independent discovery of the river, gave it his name. The Swedes maintained their position, and in their dealings with the Indians inaugurated the peaceful policy which was followed with so much advantage by William Penn. The treaty between England and Holland in 1674 transferred all Dutch settlements to the former power, but the Swedish colonists were not disturbed, and their descendants still occupy the land.

William Penn, the son of a British admiral, becoming a convert of George Fox and an enthusiastic Quaker, was cast off by

his father. He was saved from the heavier penalties which fell upon many of his religion by his family influence. Later he received, in consideration of his father's claim on the crown for £16,000, a grant of what afterward became the State of Pennsylvania. His charter gave him extensive governmental powers. He landed from the ship Welcome at New Castle, Delaware, in 1682. A few weeks later he made his famous treaty with the Indians.

The land now occupied by the city belonged to the Swedish colony. Penn's commissioners therefore selected a spot twelve miles farther up the river. Making an amicable exchange of lands they removed to the present location. The original city was bounded by the Delaware River on the east, the Schuylkill on the west, Vine Street on the north, and Cedar Street on the south. Penn left Philadelphia for the last time in 1701. He died in 1718.

"The chief cause of Pennsylvania's rapid growth was not the pleasantness of the climate, nor the fertility of the soil, nor the convenience of the situation, though these were causes of its prosperity. Pennsylvania throve because William Penn had been just."

Franklin, who was destined to exert so great an influence upon the city, was twelve years old when Penn died. Parton says, "Philadelphia is Quakerism mitigated by Franklin."

Penn had intended that Philadelphia should be "a green country place," and it maintained its rural character and appearance up to the middle of the last century. Even in 1760 there were no pavements, and the streets, of clay soils, were during wet seasons almost impassable. Money for the first pavements was raised by lottery. Carriages were scarcely used until after the Revolution. In the year 1761 there were only thirty-eight vehicles in all; in 1794 there were five hundred and twenty. There was no permanent bridge across the Schuylkill until 1804.

After seven years of alternate usurpation and concession, hope and fear, faith and distrust, the First Continental Congress was convened in 1774, holding its preliminary meeting in Smith's Tavern, whence they moved to Carpenter's Hall. On the 26th of January, 1775, a Provincial Convention was held in Carpenter's Hall. On the 10th of May, 1776, the Second Continental Congress met. On the 15th of June it chose Washington as General of the American army. The draft of the Declaration of Independence was submitted to the Congress on the 28th of June; it was acted on in secret session, and its passage was not made known until

the 6th of July. The city was occupied by the British from September, 1777, until 1778.

Congress resumed its sessions in Philadelphia and remained there until 1783.

The real prosperity and greatness of Philadelphia date from the discovery of the value of anthracite coal, about 1810. The population at this time was not far from 50,000. The existence of this coal had been known for over thirty years, and it had been used to a small extent for furnace fires and for burning in grates, but as late as 1807 its owners gave a lease of one of the veins *gratis* to a firm of iron manufacturers, but their experiment proved a failure. Even as late as 1818, 365 tons overstocked the Philadelphia market, and it was disposed of with great difficulty. Seven years later the consumption reached nearly 30,000 tons. In 1839 it was over 200,000 tons, and in 1841 the Schuylkill mines produced 1,000,000 tons.

Between 1791 and 1829 the State expended over $22,000,000 on its internal improvements. In 1825 the Schuylkill navigation was put in operation, and there was a connected system of canals between the Susquehanna and the Delaware. The opening of the Delaware and Maryland and the Delaware and Raritan Canals united Philadelphia with Baltimore on the one hand and with New York on the other.

The War of 1812 gave but a brief check to the city's growth. The first railroad communication was made in 1832 by the opening of a street line to Germantown. Later in the same year the Wilmington and Baltimore and Camden and Amboy roads were built, as was the Reading road in the following year. The Pennsylvania road was chartered in 1846. In 1834 the Columbia line, partly canal and partly railroad, was opened from Philadelphia to Pittsburg, nearly 400 miles. It was intended to be worked by horse power, but locomotives were adopted about 1836.

Philadelphia suffered severely during its earlier history from epidemics of yellow fever and later from cholera. From 2,314 cases of the latter disease in 1832 there were nearly 1,000 deaths.

The grounds were purchased for the Fairmount Water Works in 1812. The purchase of property adjoining this, with a view to preserving the Schuylkill River, beginning with Lemon Hill, bought from the assets of the United States Bank in 1844, led to the formation of one of the largest and finest natural parks in the world, equaled in extent only by Epping and Windsor Forests in England and by the Prater in Vienna. It contains 2,740 acres.

College Hall, University of Pennsylvania, Philadelphia.

Philadelphia is about 100 miles from the Atlantic Ocean by the course of the bay and river. The site of the main city is nearly level, varying from two to forty-six feet above tide water. In the immediate suburbs the land rises to a height of one hundred and twenty feet. The city is now coextensive with the county; it is twenty-three miles long, with an average width of about five and a half miles.

The width and depth of the Delaware River allow the largest steam vessels to come to the wharves, where there is a depth of fifty-seven feet at low water at the pier-heads for more than half a mile, and not less than twenty-five feet for three miles of river frontage. There is, however, a bar in the river below the city, with only twenty-five feet at high water.

The salubrity of the city is exceptional, the mortality being, according to statistics, one per thousand less than that of London, and seven less than that of New York. This favorable condition is doubtless largely due to the fact that the tenement-house system is practically unknown in Philadelphia. There is probably no other town in Christendom where so large a proportion of the population live in their own houses and sleep in rooms opening to the outer air. The water supply is not good, the drainage is very bad, and the pavement is mainly of such a character as to make cleanliness of streets impossible; yet the absence of crowding, and the exposure of every domicile to sunlight and a free circulation of air, together with the almost universal prosperity of the working class, place Philadelphia in the very front rank among the large cities of the world in the matter of good health and a low death-rate.

While the water supply is often subject to grave suspicion, and is frequently muddy, it is most abundant. It is distributed through more than ten hundred and thirty-one miles of pipe. Most of the smallest and cheapest houses have bath-rooms and the washing of sidewalks and doorsteps seems to be incessant. According to the report of 1892, the total amount of water pumped in the various works was an average of 160,810,822 gallons per day, 143 gallons per head per day. The total receipts of the department were $2,634,456.02, the total expenditures $1,372,457.31.

While the sewerage system of Philadelphia is not without some important and excellent features, especially in the matter of great trunk lines replacing natural creeks, it is very far from being, as a whole, commendable. Practically all the sewers in the old city of William Penn are as bad as they well can be. To make

matters worse, private owners are still permitted, and many of them avail themselves of the permission, to dispose of the liquid waste of their houses by discharging it into deep "wells," which are nothing more nor less than great cesspools, sunk sometimes in the yard, but very often in the cellar of the house itself. The fact that such grave and radical difficulties exist so generally, and that the death-rate, as reported, stands at so low a figure, would seem to indicate that our ideas as to the importance of sanitary improvements are not well founded; that there is some error in the statistical computation from which the death-rate is deduced; or that the largely preponderating and controlling proportion of the population lives in the outlying districts, generally with open gutters for sewers, and under other very favorable conditions. It can hardly be possible that the health and mortality statistics of the old parts of the city can be nearly so favorable as the average showing makes it appear.

As a rule, kitchen and laundry slops, and much urine, are discharged by shallow or surface drains into the street gutters, whence it finds its way through the inlet basins into the sewers. Few of the gutters are free from this laundry-colored flow of house drainage, and every inlet basin seems to be a cesspool. Refuse matter from markets and fruit stands is discharged into the gutters and inlet basins; this is particularly true with reference to street fish stands.

It is usual, especially among the smaller houses of newer construction, to carry house drainage and rain water to the vaults of privies in the back yards, and to connect the outflows of these vaults by pipe drains to the public sewers.

Roughly speaking, the entire discharge of the sewers is delivered into the rivers—into the Schuylkill, below the water-works dam, and into the Delaware along the whole river front. The intakes of the water works in the Delaware front are more or less subject to contamination from the sewage discharge during inflowing tides. The city has grown much faster than its sewerage system. It had, in 1892, over thirteen hundred miles of streets and less than five hundred miles of sewers, all told, good and bad.

This great extension of the streets of the city, rendered necessary by the system of isolated dwellings which is so universal, has another disadvantage in the fact that it has therefore become practically impossible to raise, by any bearable system of taxation, money enough to make and to maintain good pavements. In fact, the people of the Quaker City seem to have made up their minds

that good pavements are not at all essential as a condition of satisfactory living.

The foregoing account sets forth, especially in their sanitary bearings, two of the most important features of this city: the distribution of the population over a very large area in small houses, and subject to conditions of life which are in many respects of the most favorable character; and, *per contra*, the difficulties in the matter of drainage and water supply which, although marked, have not, according to statistics, prevented the death-rate from remaining one of the lowest in the world. These conditions lead distinctly to the conclusion that the presence or absence of "overcrowding" is the most important sanitary feature of a city.

The part played by Philadelphia in the civil war—1861–'65—was most conspicuous and important. A great body of troops from New York, New Jersey, and New England passed through this city, at whose volunteer refreshment saloon, "The Cooper Shop," over six hundred thousand soldiers were fed. Nearly two thousand were cared for in its hospital, managed by volunteer nurses. The cost and the administration of these splendid charities were borne entirely by citizens of Philadelphia without aid from the Government. A great sanitary fair was held in 1864, which lasted over six weeks, and which paid $1,000,000 into the treasury of the Sanitary Commission.

The great achievement of this city in modern times, which redounded enormously to its credit, and led to a great stimulation of its prosperity, was the Centennial Exposition of 1876, which is so well known to the whole American people as to call for no detailed description in this limited space.

The exhibition continued for six months. The number of admissions was 10,164,489. The admission fees paid amounted to $3,833,636.49. The United States Congress appropriated $649,250, mainly as the expense of a collected exhibit from the executive departments. It also made a loan to the Centennial Commission of $1,500,000. This loan was repaid, and a substantial dividend was returned to those who had patriotically subscribed to the stock by which the chief fund for the exhibition was raised.

Aside from its immense commercial interests, Philadelphia is, next to New York, the greatest manufacturing center of the country. In 1890 Philadelphia had 18,166 manufacturing establishments, with a capital of $375,249,715; they employed an average of 260,264 hands; the wages paid amounted to $135,917,021; the raw materials cost $577,234,446; the value of products was $311,-

645,804. The average capital of all establishments was about $20,657; the average wages, $522; and the average outlay in wages, materials, and interests of capital employed (at six per cent) was about $25,877.

BROOKLYN, N. Y.

		Population:			
Latitude	40° 41′ N.				
Longitude	73° 59′ W.	1790...	1,603	1860...	266,661
Altitude	0 to 202 feet.	1800...	2,378	1870...	396,099
Valuation	$485,626,206	1810...	4,402	1880...	566,663
Per capita	602.26	1820...	7,175	1890...	806,343
Net debt	46,847,912.47	1830...	12,406		
Per capita	58.10	1840...	36,233		
Tax per $100	2.73	1850...	96,838		

By the census of 1890 Brooklyn has a population of over eight hundred thousand, and so takes rank as the fourth city of the Union.

In 1636 a tract of 630 acres, near Gowanus, was bought from the Indians by Bennett and Bentyn, Hollanders In 1637 another Hollander (Rapalje) bought 325 acres at Wallabout Bay. The first house known to have been built (by Bennett) was burned by the Indians in 1643. There is no proof that any white person lived upon Long Island before 1636. A ferry was established in 1642. The various hamlets in the Brooklyn territory were consolidated in 1646, under the name of Breuckelen. In 1679 the ferry is spoken of as "a considerable thoroughfare." In 1665 the town was granted the privilege of a yearly "fayre and market." The growth could not have been rapid, for the New York and Brooklyn Directory of 1796 gives Brooklyn only 125 names. A picture painted in 1820 shows only an inconsiderable village.

The first great battle of the Revolution, after the Declaration of Independence—"the battle of Long Island"—was fought over land now occupied by Prospect and Washington Parks, and Greenwood, Evergreen, and Cypress Hills Cemeteries. It was after that engagement that Washington effected the masterly retreat to Manhattan Island.

Brooklyn was too small to take a conspicuous part in the War of 1812, but it came nobly to the front in the civil war of 1861–'65, being exceeded by no other city in raising regiments and supplying material aid. The sanitary fair of 1864 realized the magnificent sum of $402,943.74

Brooklyn was chartered as a village in 1816, and as a city in

1834. On January 1, 1855, the act took effect consolidating Brooklyn, Williamsburg, and Greenpoint, the effect of which is shown in the very large increase of population between 1850 and 1860. It is in one sense an outlying district of New York city, and the relations between the two are so close as to bring it within the range of what has been said concerning the growth, prosperity, and general characteristics of New York.

Although Brooklyn is and always has been spoken of as a "dormitory" for men doing business in New York, it not only has a distinctive and characteristic population of its own, but it has taken full advantage of its most favorable situation. It has on its western boundary eight and a half miles of shore occupied by piers, slips, warehouses, boat and ship yards, ferries, etc. It has experienced a great increase of prosperity, and has become still more closely allied with New York by the construction of the great New York and Brooklyn Bridge. The length of its streets in 1893 was 656.97 miles.

The water works of Brooklyn are of a very interesting character. They are fully described in Volume XVIII, Tenth Census.

The sewerage of Brooklyn is one of the earliest examples of the extensive use of vitrified pipe for city sewers in this country —a use due to the controlling arguments advanced by Mr. Julius W. Adams, C. E., the engineer of the work. For details of this system, as constructed to 1880, see Volume XVIII, Tenth Census.

Not only is Brooklyn the place of residence of a large part of the business population of New York, but it and its immediate vicinity have afforded a final resting place to generations of New-Yorkers who have passed away. Greenwood Cemetery, Cypress Hills Cemetery, Evergreen Cemetery, Calvary Cemetery, Lutheran Cemetery, and Mount Olivet Cemetery, with an aggregate area of over twelve hundred acres, still constitute the chief field for interment of the dead of New York city, as well as of Brooklyn itself.

In 1890 Brooklyn had 10,583 manufacturing establishments, with a capital of $161,730,500; they employed an average of 109,302 hands; the wages paid amounted to $65,250,054; the raw materials cost $151,060,710; the value of products was $269,244,147. The average capital of all establishments was about $15,282; the average wages, $597; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $21,356.

ST. LOUIS, MO.

		Population:	
Latitude	38° 37′ N.	1820	10,049
Longitude	90° 12′ W.	1830	14,125
Altitude	374 to 610 feet.	1840	16,469
Valuation	$279,810,390	1850	77,860
Per capita	619.37	1860	160,773
Net debt	21,376,021	1870	310,864
Per capita	47.32	1880	350,518
Tax per $100	1.40	1890	451,770

St. Louis, the fifth city in rank, has a population of 451,770. This city began with a trading post founded by Laclede, a New Orleans merchant, in 1753. The site was high and salubrious, and impressed Laclede so favorably that he described it as "a situation where he intended to establish a settlement which might become hereafter one of the finest cities of America." Being under the illusion that the vast domain west of the Mississippi still belonged to the French, he named it after the patron saint of Louis XV.

In 1804 it was still a small village of one hundred and eighty houses and about eleven hundred inhabitants. There were only two American families. The settlement was confined mainly to the present Main and Second Streets. There were two pathways up from the river, one through the present Market Street, the other through Morgan Street. The only place of worship was a little log church. There were one physician, one baker, and three blacksmiths.

In 1808 the St. Louis Flour Company was organized with a capital of forty thousand dollars. This company had much influence on the commercial development of the place, which in 1809 was incorporated as a town. In 1810 the population was only fourteen hundred; there were twelve stores, two schools, and one printing office. The stock of merchandise was estimated in value at $250,000. Peltries, lead, and whisky were the medium of exchange.

During the fiscal year 1817 the revenue of the whole county was about two thousand dollars, county expenses being little more than half that.

The first pavement—a stone sidewalk—was laid in 1818. In 1822 the Legislature granted St. Louis a city charter, and the government was inaugurated the next year, the area being three hundred and eighty-five acres, and the population about five thou-

sand. As municipal improvements were begun immediately, the hunters, trappers, bargemen, and *voyageurs* disappeared to more congenial fields, more enterprising newcomers of other occupations taking their place, so that there was a decided growth in material improvements, although from 1820 to 1828 the actual population increased only six hundred. In 1829 marked improvement began. The United States Bank, then in the full tide of success, established a branch here, to the great advantage of local interests. The building of brick houses increased rapidly, and during the year 1831 sixty different steamboats were plying from the levee, paying a wharfage amounting to more than two thousand dollars. In 1832 a marked check was put on immigration and on enterprise by the cholera epidemic. In 1835 there were one hundred and twenty-one steamboats. In 1836 a daily mail to the East was established.

In the first year of its existence as a city (1823) $4,050 were raised in taxes; in the next year this rose to $5,665; after that date it fell considerably, going as low as $1,970, and not reaching the maximum of 1824 until 1834. In 1835 the amount rose to $8,332, and in 1836 to $26,615; after that the progress was steady, and in 1842 it reached $47,780. In 1843 the taxable property was assessed $11,721,425, and one per cent of that amount was levied in taxes. The commerce with the Missouri and the upper Mississippi now began to assume great proportions. In 1845 the steam tonnage amounted to over 20,000 tons, and in 1854 to over 48,000 tons. The streets were first lighted with gas in 1847, and telegraph lines from the East reached the opposite side of the river in the same year. The first division of the Ohio and Mississippi Railroad was also then opened. Ground was broken for the Pacific Railroad in 1850, and its first division was opened in 1853.

The cholera epidemic of 1849 was especially grievous here, claiming more than 4,000 victims out of a population of less than 64,000, the mortality at one time reaching 160 per day. No disaster, however, could check the prosperity of the city. The census of 1850 showed a population of 77,860, and a manufacturing product of more than $15,000,000. In the seven years from 1852 to 1859 the population increased from 94,000 to 185,000, and the value of real estate and personal property had risen to $105,000,000. The increase in the value of real property was fabulous. In 1845 a lot of land on Second Street was bought for $800. In 1855 one third of it was sold for $42,000, and the rest was held for $100,000.

St. Louis, from its position on the border, in a "doubtful" State,

suffered severely during the war, though never the seat of serious actual conflict. It lost two thirds of the volume of its business. After the war prosperity returned quickly, and railroads were greatly extended. In 1863 less than 1,500,000 bushels of corn were received. In 1866 the amount rose to 7,233,671 bushels. The prosperity of the city was again much increased by the building of the steel bridge across the Mississippi, which was completed in 1874.

The form of government since 1876 has been described on an earlier page (pp. 230 *et infra*).

St. Louis had, in 1890, 818 miles of streets. The paving is almost entirely of macadam and gravel, there being but 53 miles in all paved with other materials.

The water works, constructed in 1867–1893, cost $13,000,000, with a capacity of 132,000,000 gallons per day. The supply is taken from the Mississippi River and pumped to reservoirs through settling basins. Gas was furnished by private companies. It has since been largely superseded by the electric light. The total length of sewers in 1890 was about 328 miles, the total cost being $7,206.780.

In 1890 St. Louis had 6,148 manufacturing establishments, with a capital of $141,872,386; they employed an average of 94,051 hands; the wages paid amounted to $53,294,630; the raw materials cost $122,216,570; the value of products was $229,157,343. The average capital of all establishments was about $23,076; the average wages, $568; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $29,949.

BOSTON, MASS.

		Population:			
Latitude	42° 21′ N.				
Longitude	71° 4′ W.	1765...	15,520	1850...	136,881
Altitude	0 to 200 feet.	1790...	18,038	1860...	177,840
Valuation	$924,134,300	1800...	24,937	1870...	250,526
Per capita	2,060.61	1810...	33,250	1880...	362,839
Net debt	32,341,742.03	1820...	43,298	1890...	448,477
Per capita	72.11	1830...	61,392		
Tax per $100	1.28	1840...	93,383		

Boston, the sixth city in size, had by the census of 1890 a population of 448,477. Its first settlement was made by John Winthrop and his associates at Charlestown in 1630, ten years after the landing of the Pilgrims on Cape Cod. They subsequently

moved to the three-hilled peninsula. Its growth was rapid and steady, and it has always maintained its position as the metropolis of New England. Josselyn thus describes its appearance in 1660–1670: "Their streets are many and large, paved with pebble stones, and the south side adorned with gardens and orchards. The town is rich and very populous, much frequented by strangers. . . . On the northwest and northeast two constant fairs (ferries) are kept for daily traffic thereunto. On the south side there is a small but pleasant Common, where the gallants walk with their *marmalet* madams as we do in Morefields, &c., till the nine o'clock bell rings, then home to their respective habitations, when presently the constables walk their rounds to see good order kept and to take up loose people."

The only serious setback to the prosperity of the community was that which befell in consequence of the prominent part which it took in connection with the outbreak of the Revolutionary War. The conflagration of 1872, which swept over a large part of the business portion of the city, can hardly be regarded as a setback, in view of the rapid and entire transformation which followed in the characteristic architecture of this important quarter of the town. Still, the pecuniary loss was very heavy, reaching $75,000,000. "What had before that time been called the great fire of 1760, destroying 350 houses, caused a loss of $100,000."

The total length of streets in 1893 was 443.34 miles, of which 209 miles were paved with macadam. The total disbursements for pavements from 1856 to 1893 were $29,134,186.81.

Boston has always been noted for its parks, its beautiful "Common" having been, up to the construction of Central Park, New York, in 1857, the largest and finest public pleasure ground in America. The system has been now greatly extended, and its supremacy in this respect has been bravely contended for. The total area of the parks is about 1,200 acres, and the total cost of the acquisition of land for the same about $5,000,000. Forty minor parks, generally small open spaces, turfed and planted with trees, are scattered through the city.

The sanitary organization is unusually complete, well regulated, and effective. Because of the limitation of space here, the reader is referred to the minute account of the same in Volume XVIII of the Report of the Tenth Census, pages 122–135.

Boston has always been a most important commercial port. Eight hundred and thirty vessels of various tonnage had been built up to the year 1676. The outward and inward clearances in

1771 amounted to 135,000 tons. The tonnage increased from 150,000 tons in 1811 to 193,500 tons in 1842, progress in the interval having been retarded by war and by other depressing influences. In 1843 Boston ranked as the first port in the United States for the extent of its trade connections with the East. The total value of the foreign trade in 1879 was estimated at $100,000,000. Its domestic trade was at the same time estimated at $1,200,000,000. Boston's commercial position at the end of 1879 was that of the second city in the Union in the value of its imports and the third in the value of its domestic exports.

In 1890 Boston had 7,942 manufacturing establishments, with a capital of $118,198,539; they employed an average of 90,805 hands; the wages paid amounted to $55,125,872; the raw materials cost $105,602,569; the value of products was $210,936,616. The average capital of all establishments was about $14,883; the average wages, $607; and the average outlay in wages, materials, and interest on capital employed (at 6 per cent) was about $21,131.

BALTIMORE, MD.

Latitude	39° 17′ N.
Longitude	76° 37′ W.
Altitude	0 to 250 feet.
Valuation	$277,171,612
Per capita	638
Net debt	16,100,854.52
Per capita	37.06
Tax per $100	1.73

Population:

1790	13,503	1860	212,418
1800	26,514	1870	267,354
1810	46,555	1880	332,313
1820	62,738	1890	434,439
1830	80,620		
1840	102,313		
1850	169,054		

Baltimore, the seventh city in size, had, by the census of 1890, 434,439 inhabitants. The land on which Baltimore was subsequently laid out was taken up in 1668; it was occupied by planters, but these were also merchants trading with London and other foreign ports. The petition "praying that a bill may be brought in for the building of a town on the north side of the Patapsco River, on land supposed to belong to Messrs. Charles and Daniel Carroll," was introduced into the Assembly in July, 1729. As passed, it provided for the laying out of sixty acres of land in and about the place where "one John Fleming" lived. There were to be sixty equal lots, one of which was to be taken by the owner, after which the remaining lots were to be taken up by others paying the owner its determined valuation. Early in 1730 it was duly laid out and disposed of. The whole area was comprised between the

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Nob Hill, San Francisco.

west branch of the Patapsco on the south, the Chalk Hills of Charles and Saratoga Streets on the north, a gully about Liberty Street on the west, and the swamp bordering Jones's Falls on the east. At this time tobacco was the common currency of the province, and taxes were often laid in it.

In 1762 Baltimore had 200 inhabitants, twenty-five houses, one church, and two taverns. The population of the county was over 17,000, including 569 convicts "designed for compulsory labor in the county and sold for certain terms." There were over 4,000 black slaves. Other servants in Maryland were of the class of "redemptioners" provided for by Lord Baltimore in his radical scheme of colonization. These were bound to serve first five years and later four years, in consideration of the cost of their transportation. The convicts were sold to labor for considerable terms.

Prior to 1800 there were not half a dozen four-wheel carriages kept in the city. Street lamps and policemen were introduced in 1783. Although there was a population of 8,000, only three constables were required during business hours, and four watchmen for the night. According to an account published in 1799, there were then in Baltimore about one hundred and thirty lanes, streets, and alleys; not all, however, were built upon. There were about 3,500 houses, chiefly of brick. Manufacturing was mainly confined to sugar, rum, tobacco, snuff, cordage, paper, saddlery, and shipbuilding.

In 1804 a company was formed, with a capital of $250,000, for the introduction of water. Its shares at one time sold for 900 per cent above par. In 1817 a charter was granted for a gaslight company.

In 1819 and 1821 great distress was caused by epidemics of yellow fever. In 1820 to 1825 Baltimore was probably the largest flour market in the world. In 1823 nearly 250,000 barrels were shipped. The tobacco shipments of the same year amounted to nearly 22,000 hogsheads. In 1827 the first railroad company in the United States, now the Baltimore and Ohio, was chartered, and the city and State were authorized to subscribe to the stock. The stock subscriptions were open for eleven days. There were 22,000 subscribers to the total amount of $4,178,000. There was no thought of using steam on this road. Horses were to do all the work, and even after the line was completed to Frederick, in 1831, the cars were drawn by relays of horses.

Baltimore suffered frequently during its early history from

floods and from fires. The most extensive conflagration occurred in 1873. One hundred and thirteen buildings were destroyed, the loss amounting to about $750,000.

Baltimore in 1893 had nearly 800 miles of streets. The total amount of paving done up to that period was some 36,000,000 square feet. The water works are capable of furnishing an aggregate daily supply of 225,000,000 gallons, the storage supply being 2,346,000,000. The supply from the Gunpowder is brought through a tunnel seven miles long and twelve feet in diameter, the greater part of which is through rock. It is said to be the third longest tunnel in the world, being surpassed only by the Mont Cenis and the St. Gothard. Its capacity is 170,000,000 gallons per day. The receipts for water average annually $600,000, the working expenses being $150,000. The average consumption is estimated at ninety gallons per day per head of population.

Baltimore, so far as its drainage is concerned, is mainly in the condition of a small country town with paved streets. In 1880 it had less than twelve miles of sewers, and no material improvement in this direction has since been made. Drainage is by surface flow.

In 1890 Baltimore had 5,266 manufacturing establishments, with a capital of $92,723,677; they employed an average of 83,745 hands; the wages paid amounted to $35,914,854; the raw materials cost $73,770,001; the value of products was $141,723,599. The average capital of all establishments was about $17,608; the average wages, $429; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $21,885.

SAN FRANCISCO, CAL.

Latitude	37° 48′ N.	Population:	
Longitude	122° 24′ W.	1860	56,802
Altitude	0 to 400 feet.	1870	149,473
Valuation	$342,644,179	1880	233,959
Per capita	1,145.97	1890	298,997
Net debt	375,970		
Per capita	1.26		
Tax per $100	1.61		

The eighth city in size is San Francisco, which, according to the census of 1890, has a population of 298,997.

The site of this city was first settled by Franciscan monks. In 1776 they established a military post in the name of the King

of Spain. In 1831 the population, including Indians, numbered six hundred and eight. The surrounding country about this time began to be occupied by trappers, whalers, and adventurers. A considerable trade in hides and tallow grew up. The town of Yerba Buena was founded about 1835. In 1846 it had fifty houses and two hundred inhabitants. In July of that year news of the war with Mexico was received, and Commander Montgomery, of the United States Navy, took possession of Yerba Buena and raised the American flag. In 1848 California was ceded to the United States by treaty. In 1847 the name of the town was changed to San Francisco. In 1848 this town had one hundred and thirty-five dwelling houses, twelve unfinished houses, twelve stores and warehouses, and thirty-five shanties. Its population was about one thousand. The first effect of the discovery of gold was nearly to empty the town of its population, which hastened to the gold fields. Emigration from the Eastern States soon set in, and in 1849 the population was fully five thousand. At the close of the following year it was about thirty-five thousand, and during the next ten years increased to fifty-seven thousand. Its prosperity received another great impetus on the discovery of the value of California for the production of wheat.

In December, 1849, nearly an entire block in the busiest portion of the city was destroyed by fire, with a loss estimated at $1,000,000. Rebuilding began before the ashes were cold. Six months later another conflagration started on the same spot, destroying within a few hours three blocks and $4,000,000 worth of property. Within ten days more than half this area had been covered with new buildings. Two months later another fire broke out which burned $5,000,000 worth of property. The work of rebuilding was immediately begun again. In September there was another fire, destroying $300,000, and in December another, destroying $1,000,000 worth of property. In May, 1851, the entire business portion of the city for twenty blocks was burned to the ground; fifteen hundred buildings and $10,000,000 worth of property were lost. A month later another fire destroyed $3,000,000 worth. The construction of more substantial buildings now began, and an efficient fire department was established, so that subsequent fires have been much less disastrous. Later, the failure of placer mining and the breaking out of the gold excitement on the Fraser River produced a very depressing effect on the city. Early in 1858 real estate became unsalable, and an alarming exodus from the city set in; a finan-

cial panic prevailed, and there was a general foreclosure of mortgages. Before the end of the year confidence began to revive, and in 1859–'60 there was a great increase in the value of property along the whole coast, and in San Francisco especially, due to the discovery of gold and silver deposits in the Comstock lode. In 1864 doubts began to be felt as to the future of the Comstock. The depression caused thereby was checked by the beginning of the building of the Central Pacific Railroad. When this was completed, and it was seen how extravagant had been the expectations based upon it, another period of depression ensued. In 1875 the failure of the Bank of California produced another panic, and much financial distress followed. Another period of depression occurred in 1878–'79 because of the socialistic agitation, which weakened confidence in the security of property.

An important incident of the development of this community was that of the celebrated Vigilance Committee, the beneficial effect of which was felt in politics for years after it ceased to exist. The formative period seems now to have been safely passed, and San Francisco is a magnificent city, with most of the attributes of a civilized modern community, modified perhaps by the absence of what might be called pure patriotism in its municipal government.

San Francisco had, in 1890, sixteen lines of cable street railways, carrying over 45,000,000 passengers annually. It has regular steamship service with Japan, China, Australia, Sandwich Islands, and many points on the Pacific coast.

The city is supplied with water by a private corporation known as the Spring Valley Water-Works Company, of which the works up to July 1, 1893, have cost $27,000,000. Water is brought from storage reservoirs with a combined capacity, in 1893, of 29,000,000,000 gallons. The average daily consumption was 20,000,000 gallons. The water is largely sold by meter. "Families consume invariably less than their rates when they use meters, and from 2 to 100 times more water without meters."

The sewerage system of San Francisco is as a whole utterly bad, most of the work being characterized only by excessive cost and great inefficiency.

In 1890 San Francisco had 5,059 manufacturing establishments, with a capital of $74,834,301; they employed an average of 48,446 hands; the wages paid amounted to $30,979,374; the raw materials cost $78,656,470; and the value of products was $135,625,754. The average capital of all establishments was about

$18,437; the average wages, $639; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $28,117.

CINCINNATI, OHIO.

Latitude	39° 6′ N.
Longitude	84° 30′ W.
Altitude	440 to 904 feet.
Valuation	$188,944,480
Per capita	636.37
Net debt	5,842,490.09
Per capita	19.67
Tax per $100	2.74

Population:

1810	2,540	1880	255,139
1820	9,642	1890	296,908
1830	24,831		
1840	46,338		
1850	115,435		
1860	161,044		
1870	216,239		

By the census of 1890 Cincinnati had a population of 296,908. It was founded in 1788 under the name of Losantiville. A fort was erected in 1789, which was occupied by General Harmer with three hundred men. The name was changed to "Cincinnata" in 1790. The present form was soon given by common usage. By the end of that year it had assumed the appearance "of a town of some respectability." Much trouble was experienced from the Indians, which seriously checked its growth. The contest with the aborigines finally assumed the proportions of a war (1794), General Anthony Wayne leading a force of 3,500 men against the enemy and gaining a great victory. A treaty of peace was finally made in 1795. While the country to which Cincinnati opened the way grew rapidly, the town itself did not. Its population in 1795 was about 500, and ten years later only 960. In 1810 the population had increased to 2,540. In 1815 there were nearly 1,100 houses, about 20 of stone and 250 of brick; 660 were residences, the others public buildings, shops, warehouses, etc.

At that period the water supply was taken from the Ohio and hauled up in barrels. Muddy though it was, it was preferred to the well water. There was at this time no iron foundry in Cincinnati, but the manufacture of cotton and woolen machinery had been carried on for six years. There were a steam saw mill, four cotton-spinning factories, two breweries, and a mustard factory. Drake, in his "Pictures of Cincinnati," says of these times: "Wealth is pretty equally distributed, and the prohibition of slavery diffuses labor, while the disproportionate immigration of young men, with the facility of obtaining sustenance, leads to frequent and hasty marriages, and places many females in the situ-

ation of matrons who would of necessity be servants in older countries. The rich, being thus compelled to labor, find but little time for indulgence in luxury and extravagance. Their ostentation is restricted, and industry is made to become a characteristic virtue."

Cincinnati was incorporated as a city in 1819. The wonderful growth of the place came from its relation to the business of the Ohio River. The first regular packet line between Pittsburg and Cincinnati was established in 1794, consisting of four keel boats of twenty tons each. In 1810 a journey from New York to Cincinnati necessitated going by vessel to Philadelphia, by Conestoga wagon to Pittsburg, and then by keel boat down the Ohio, requiring sixty days.

The imports were chiefly brought across the mountains from Philadelphia, Baltimore, and New York. The exports followed the course of the rivers to New Orleans.

The first pioneer steamboat on the Western rivers, which revolutionized methods of trade, was the New Orleans, built by Robert Fulton in 1811, at Pittsburg, at a cost of $40,000. She had a stern wheel and sails, and was over three hundred tons burden. None of the first boats built were able to ascend the Mississippi—they went down stream well enough, but never came back—until the Enterprise, a boat of only seventy tons, with a single wheel at the stern, made the voyage from New Orleans to Cincinnati in twenty-eight days. Steamboating did not become active until 1817. Cincinnati became the point for the distribution of the immense supplies of the great regions of which she was the center, receiving in return imports from all parts of the world. The imports of 1815 amounted to about $500,000, and in 1818 they had risen to more than $1,500,000. In 1819 there were 75 steamboats navigating the Western rivers, in 1826 there were 143, and in 1841 there were 437. The construction of canals added greatly to the development of the country, and to the amount of business done in the city. The Little Miami Railroad was finished in 1826, and railroads have long since been the chief means of communication, but in the stimulation of growth they have had a greater effect on Chicago and St. Louis than on Cincinnati.

Cincinnati has suffered seriously from fire, flood, and disease, but it has been said that she never went backward. This is not quite true as relating to the value of real estate. Values declined during the ten years preceding the opening of the Miami Canal.

Up to 1848 this town lacked many of the characteristics of a great city. Until then scavenging was largely done by hogs, ash-piles encumbered the streets, and the water supply was still very defective.

In addition to the debt of the city proper, as given above, there is an indebtedness of $18,610,000 on the Cincinnati Southern Railroad, which is owned by the city. This is self-sustaining.

It is hardly fair, in rating our cities according to their population, to restrict Cincinnati to its census enumeration, for it has greatly overflowed its "limits," and has a very large suburban population in the country north of it; while across the river, in Kentucky, the thriving cities of Newport and Covington—connected with Cincinnati by bridges and ferries—are really only an extension of its integral population. The joint population of these two municipalities is 62,289; and they, with the suburban places lying north of the city, referred to above, would probably carry the total to 370,000, and give Cincinnati a higher rank in our scale.

Cincinnati claims the distinction of having given to the world its first steam fire engine. The first machine made raised steam in six minutes, and threw its stream 100 feet high.

In 1892 Cincinnati had 500 miles of streets, 300 miles being improved, mainly with cobblestones and macadam. There were 165 miles of street railways; 95 miles of these are operated by electricity. Twenty-four lines of steam railroads radiate from the city.

The water works, originally owned by a private corporation, were bought by the city in 1839. Their total cost has been $9,173,452.91. The average amount of water pumped per diem, in 1893, was 42,119,406 gallons; pumping capacity, 97,000,000. The average was about 142 gallons per head per day.

In 1893 there were 144 miles of sewers of all kinds, with 9,640 sewer connections.

In 1890 Cincinnati had 7,832 manufacturing establishments, with a capital of $104,483,032; they employed 96,689 hands; the wages paid amounted to $47,691,332; the raw materials cost $92,545,231; the value of products was $196,063,983. The average capital of all establishments was about $13,341; the average wages, $493; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $18,706.

CLEVELAND, OHIO.

		Population:	
Latitude	41° 30′ N.	1820	606
Longitude	81° 42′ W.	1830	1,876
Altitude	570 to 813 feet.	1840	6,071
Valuation	$121,280,215	1850	17,034
Per capita	464.05	1860	43,417
Net debt	6,943,942	1870	92,829
Per capita	26.57	1880	160,146
Tax per $100	2.75	1890	261,353

In 1752 Benjamin Franklin recommended "that a fort and town for trade" should be erected at the mouth of the Cuyahoga River. The British occupied the country west of the river until 1790. In 1796 Cleveland was settled by the Connecticut proprietors of the Western Reserve. The settlement was first called Euclid, but it was soon named after General Cleaveland, who directed its laying out. For many years its growth was slow. Fever and ague prevailed in the vicinity, and its harbor was of little value. In 1802 lots formerly worth $50 were sold for $25, and without prompt payment at that. In 1815, at the first election after the incorporation as a village, there were twelve votes cast. The new era of the city began with the opening of the Ohio and Erie Canal, which was finished in 1832. In 1830 the population of the village was a little over 1,000. In 1836 it was chartered as a city.

The water supply is derived from Lake Erie. It is pumped by engines with a daily capacity of 70,000,000 gallons to two reservoirs, holding 118,000,000 gallons. The total cost of the works to 1893 has been $6,367,492.94, and the annual operating expenses are about $132,400.

The manufacturing and commercial activities incident to the progress of the war and the discovery of petroleum (Cleveland was the birthplace of the Standard Oil Company) gave this town its great start. Its population was considerably more than doubled between 1860 and 1870, the increase being 115 per cent; that from 1870 to 1880 was 73 per cent; and from 1880 to 1890, 63 per cent.

In 1890 Cleveland had 2,307 manufacturing establishments, with a capital of $69,732,761; they employed an average of 50,674 hands; the wages paid amounted to $28,355,505; the raw materials cost $65,645,649; the value of products was $113,240,115. The average capital of all establishments was $30,227; the average wages, $560; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $42,560.

BUFFALO, N. Y.

Latitude	42° 53′ N.	Population :	
Longitude	78° 52′ W.	1830	8,668
Altitude	573 to 633 feet.	1840	18,213
Valuation	$222,572,885	1850	42,261
Per capita	870.57	1860	81,129
Net debt	11,005,878.98	1870	117,714
Per capita	43.05	1880	155,134
Tax per $100	1.58	1890	255,664

By the census of 1890 Buffalo has a population of 255,664.

Situated at the eastern end of Lake Erie and just above the rapids of Niagara River, it is indicated by Nature as a seat of a considerable urban population. The first Europeans who visited the region, early in the seventeenth century, found 12,000 Indians settled in several villages on both sides of the river. Up to the Treaty of Paris, in 1763, when France lost control over Canada, she had also controlled western New York.

When the British Government located the Indians in communities and established agencies, one agency was established at Buffalo Creek, in 1780. A visitor in 1792 writes: "There was but one white man there. I think his name was Winney, an Indian trader. . . . He had rum, whisky, Indian knives, trinkets, etc. His house was full of Indians. They looked at us with a good deal of curiosity. We had but a poor night's rest. The Indians were in and out all night getting liquor." The forts on the American side of the Great Lakes and the control of the Buffalo Creek settlement were transferred to the United States in 1796. The possession of western New York being now undisputed, its colonization was rapid. The Holland Company, in 1793, bought large tracts in western New York, including the land on which Buffalo now stands. They proceeded actively to develop their property, and had the city surveyed and laid out in 1797. It was christened "New Amsterdam," and this name was used in conveyances until about 1812, when the name of Buffalo was substituted. The prominence of the site selected as that of the principal town, at the easterly end of Lake Erie, was fully established by the construction of the pier and breakwater at the mouth of Buffalo Creek and the extension of the Erie Canal to that point. Lots were sold only to actual settlers, so that, even a quarter of a century after the original survey, many lots remained unsold; but the stability of the settlement was established.

Progress was checked during the War of 1812, but at its close

Buffalo began to revive. The village was organized under a new charter in 1816, and its powers were augmented in 1822. In 1830 the population exceeded 8,000. In 1832 the city was incorporated. "It was a little city erected upon the substance of things hoped for rather than things seen." It contained a few scattered brick buildings, and perhaps twenty handsome dwellings mostly of wood; but the bulk of the city consisted of frame houses, generally from one to two stories high, even on Main Street. The streets were unpaved and mainly unlighted. . . . There were some forty manufacturing establishments in the city, perhaps altogether not equaling, in capital and men employed, one of the great establishments of the present day." In 1836 there were nearly 16,000 inhabitants. One street was paved for one fifth of a mile. There was one mile of sewers, imperfectly constructed, distributed through three streets. There was a single railroad—that to Niagara Falls. The canal tolls amounted to only $106,213. The shipping belonging to the port aggregated only 8,951 tons. The first grain elevator in the world was built in Buffalo in 1842; its storage capacity was 55,000 bushels, and it raised 2,000 bushels per hour. In 1865 there were twenty-seven elevators, storing, together, fully 6,000,000 bushels, and capable of moving in a single day more than the entire annual receipt at the ports at the time when the first elevator was built. Since that time the progress of the city in both commerce and manufactures has been little interrupted, and is to-day almost unequaled.

Nineteen railroads enter the city, and four steamboat lines afford communication with points on the Great Lakes. The water works are owned by the city, their cost to 1893 being $6,000,000. The water is pumped from the head of Niagara River, and the daily average supply in 1893 was about 53,800,000 gallons, or an average of 193 gallons per capita, the yearly cost of maintenance being $150,000.

The sewerage of Buffalo has been a matter of accidental growth rather than of deliberate plan, but there was constructed in 1882–1884 an intercepting sewer four miles long and eight feet in diameter, which has relieved the most serious difficulty with the system.

In 1890 Buffalo had 3,565 manufacturing establishments, with a capital of $70,707,145; they employed an average of 51,433 hands; the wages paid amounted to $25,495,833; the raw materials cost $54,120,611; the value of products was $100,052,208. The average capital of all establishments was about $19,834; the

average wages, $496; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $23,523.

NEW ORLEANS, LA.

		Population:			
Latitude	29° 56′ 59″ N.	1810	17,242	1880	216,090
Longitude	90° 4′ 9″ W.	1820	27,176	1890	242,039
Altitude	0 to 13± feet.	1830	29,737		
Valuation	$136,977,107	1840	102,193		
Per capita	565.93	1850	116,375		
Net debt	15,871,047.85	1860	168,675		
Per capita	65.57	1870	191,418		
Tax per $100	2.70				

By the census of 1890 New Orleans had a population of 242,039.

New Orleans was originally built on a slightly elevated ridge of silt which formed the left bank of the Mississippi River. Its highest elevation is about thirteen feet above the level of the Gulf of Mexico; its lowest, in the marsh between the river and Lake Pontchartrain, is about one and a half feet below the level of the Gulf. It is kept dry, so far as this is effected, by artificial pumping.

The history of New Orleans, published in Volume XIX of the Report of the Tenth Census, occupies from pages 213 to 267. It was written by Mr. George W. Cable, and is illustrated by numerous historical maps of great interest. It was first settled by Bienville, in 1722, under the government of France, which then owned the whole Louisiana territory. In 1764 its control passed to the King of Spain under the secret act of cession at Fontainebleau. Mr. Cable says: "The Spanish conquest never became more than a conquest. . . . Its customs and regulations caused certain transitions in the agriculture of the province and in the trade of the town, and there it stopped—from the beginning to the end a foreign body. . . . The creole . . . for thirty-five years bore it about in his flesh, an unextracted missile, never absorbed, never rejected, but sometimes provocative of slight inflammations that called for wise and gentle handling. The Spanish governors . . . had the fortunate discretion to treat the people from first to last as a wounded and paroled community that might be conciliated, but which it were vain to attempt to proselyte. Ungaga wrote (1773), "I can not flatter his Majesty so much as to say that the people have ceased to be French at heart."

Bishop Penalvert wrote (1795), "His Majesty possesses their bodies and not their souls."

The control passed to the United States in 1798. The details of the growth and development of New Orleans are too intricate for useful recapitulation here. The city is the great seaport of the Southwest, and since the construction of the jetties by Captain Eads (completed in 1879) the largest vessels afloat can sail to its wharves.

New Orleans has 625 miles of streets; of these, 89 miles are paved, mainly in an imperfect way. The water works belong to a private corporation; the supply is pumped from the Mississippi River. It was not until 1893 so settled and clarified as to be useful for all domestic purposes. The pumping capacity is 35,000,000 gallons per day. The daily consumption is 7,500,000. The works cost about $2,500,000.

The city has practically no sewers. The liquid portion of the house drainage flows into the street gutters, some of which are flushed during the summer season. This waste flows off with the storm flow into large canals in the rear of the city, and is pumped into Lake Pontchartrain by large Dutch paddle-wheel pumps.

In 1890 New Orleans had 1,961 manufacturing establishments, with a capital of $26,319,277. They employed an average of 25,221 hands; the wages paid amounted to $10,887,584; the raw materials cost $28,271,445; and the value of products was $48,295,449. The average capital of all establishments was about $13,421; the average wages, $432; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $20,774.

PITTSBURG, PA.

		Population:			
Latitude	40° 27′ N.				
Longitude	79° 59′ W.	1800...	1,565	1870...	86,076
Altitude	800 feet.	1810...	4,768	1880...	156,389
Valuation	$275,000,000	1820...	7,248	1890...	238,617
Per capita	1,152.47	1830...	12,568		
Net debt	9,500,000	1840...	21,115		
Per capita	39.81	1850...	46,601		
Tax per $100	1.30	1860...	49,221		

Pittsburg had, according to the census of 1890, a population of 238,617.

In the spring of 1760 a fort was built at the junction of the Alleghany and Monongahela Rivers, and a little village sprang

New Orleans—View on the levee.

up around it. In 1761 there were 104 houses, with a population of 233. In the same year they hired a schoolmaster, "and subscribed above £60 for this year for him." The school master also read "Ye Litany and Common Prayer on ye first day to a congregation of different principles (he be a Prisbiterant)."

The town was extended and laid out in 1765. Washington's description of the town in 1770 does not indicate progress. He says, "The houses, which are built of logs and range in streets, are on the Monongahela, and I suppose may be about twenty in number and inhabited by Indian traders." Arthur Lee in 1784 recorded his visit in his journal, and, after describing the use of the local coal, he said, "The place, I believe, will never be considerable."

The census made in 1796 gives the population as 1,395. The growth of the city, as influenced by the navigation of the Ohio, corresponded measurably with that of Cincinnati. Its first steamboat was built in 1811.

The region abounds in coal, iron ore, and other minerals, and it early became the chief manufacturing city "across the Alleghenies." From the very beginning of the century it has been a great center of iron smelting and working. The industry next in importance is the manufacture of glass, which is said to date back to 1795.

The water works belong to the city. They are on the Allegheny River, ten miles from its mouth. They are furnished with four pumping engines, costing $750,000. These are worked two at a time, alternately, against a water pressure of 165 pounds per square inch, into a reservoir 365 feet above the river. From this reservoir water is pumped 275 feet higher for the high-service system. The cost of the works was about $5,000,000. The daily consumption of water was 42,000,000 gallons.

The introduction of natural gas, which is now almost universally used in the factories, marked a very important era in the history of the city. It is estimated that it annually does the work of 48,000,000 bushels of coal, and that the productive capacity of the factories has been increased over twenty per cent by its use.

In 1890 Pittsburg had 1,420 manufacturing establishments, with a capital of $108,368,838; they employed an average of 56,438 hands; the wages paid amounted to $33,898,152; the raw materials cost $69,892,195; and the value of products was $126,859,657. The average capital of all establishments was about

$76,316; the average wages, $601; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $77,671.

WASHINGTON, D. C.

Latitude.....	38° 53′ N.	Population:			
Longitude.....	77° 2′ W.	1800...	3,210	1870...	109,199
Altitude.....	0 to 103.7 feet.	1810...	8,208	1880...	147,293
Valuation.....	$170,733,645	1820...	13,247	1890...	230,392
Per capita.....	741.06	1830...	18,826		
Net debt.....	18,733,726.23	1840...	23,364		
Per capita.....	83.48	1850...	40,001		
Tax per $100.....	1.50	1860...	61,122		

Washington, by the census of 1890, had a population of 230,392.

The initial corner stone of the lines of the old District of Columbia, ten miles square and lying on both sides of the Potomac, was set on the 15th day of April, 1791. The portion of the District lying on the Virginia side of the river was returned to that State in 1846. The north wing of the old Capitol was begun in 1797; this, the President's house, and the War and Treasury offices were ready for occupancy in 1800. Congress began its session in the completed wing November 21, 1800. Georgetown, in the northern part of the District, and now a part of the city of Washington, was laid out in 1752. It was incorporated as a city in 1789, and was made a port of entry in 1790. During the early part of this century Washington was little better than a wilderness. In 1839 George Combe wrote, "The town looks like a large, straggling village reared in a drained swamp." Pennsylvania Avenue was for nearly its whole length a deep morass covered with alder bushes. Members of Congress lodged three miles away, in Georgetown. The streets and avenues were in a chronic state of neglect, "the driving of dust alternating with the deepest mud and rendering them almost impassable." In 1871 the District was taken in hand by the territorial government. Since that time public improvements have been rapidly and judiciously prosecuted, until this is now in many respects the most beautiful city in the country, much the best paved, and one of the best built. In addition, the territorial government built up a debt of $20,000,000. In 1874 the territorial government was abolished, and a provisional government of three members was established. This still continues, and is most satisfactory, save to local politicians.

In 1890 Washington had 235 miles of streets, of which 163 miles were paved, mainly in the best manner. Nearly the whole length of street (230 miles) is lined with shade trees, and there are 230 miles of grassed places with an average width of twenty feet.

The water works belong to the city, and the average daily consumption is 40,000,000, being 210 gallons per head of population. Their total cost has been $8,500,000. The cost of water for an average family is only $4.50 per annum.

There are 266 miles of sewers, more than 200 miles being of vitrified pipe. The total cost of the sewers has been $6,795,759.

In 1890 Washington had 2,295 manufacturing establishments, with a capital of $28,865,089; they employed an average of 23,404 hands; the wages paid amounted to $14,622,264; the raw materials cost $17,194,667; and the value of products was $39,331,437. The average capital was $12,577; average wages, $625; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $14,618.

DETROIT, MICH.

		Population:	
Latitude	42° 20′ N.	1820	1,422
Longitude	83° 3′ W.	1830	2,222
Altitude	580 to 635 feet.	1840	9,102
Valuation	$199,679,210	1850	21,019
Per capita	969.90	1860	45,619
Net debt	2,163,292.41	1870	79,577
Per capita	10.51	1880	116,340
Tax per $100	1.51	1890	205,876

By the census of 1890 Detroit had a population of 205,876.

Detroit was founded by La Motte Cadillac, in 1701. It soon rose to importance among the western outposts of Canada. At the close of the French War it contained 2,500 inhabitants. It was included in the surrender to the British crown in 1760, when it lost its importance as a military post. In 1768 it had but 572 inhabitants. The American flag was unfurled there in 1796. The population was still mainly French. The town was destroyed by fire in 1805. In the War of 1812 it was captured by the British, but was recaptured by General Harrison the next month.

Detroit recovered quickly, and was incorporated as a city in 1815. As late as 1827 it was little more than a military and fur-trading post. It suffered from frequent large fires, each of which

led to a great improvement in the character of the building. Its greatest increase of population was between 1844 and 1854 and between 1864 and 1874, the latter amounting to 47,000, being partly due to an extension of the city limits.

Detroit has 500 miles of streets, 192 miles of which are paved. The water works belong to the city. The average daily pumping capacity in 1890 was 33,033,592 gallons, being 160 gallons per head per diem.

It has 332 miles of sewers, principally of brick or stone. The total cost of the sewers has been $4,511,043.42.

In 1890 Detroit had 1,746 manufacturing establishments, with a capital of $45,041,167; they employed an average of 38,178 hands; the wages paid amounted to $18,900,309; the raw materials cost $41,360,058; and the value of products was $77,351,546. The average capital was $25,797; average wages, $495; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $36,061.

MILWAUKEE, WIS.

		Population:	
Latitude	43° 4′ N.	1840	1,712
Longitude	88° 0′ W.	1850	20,061
Altitude	580 to 755 feet.	1860	45,246
Valuation	$135,884,570	1870	71,440
Per capita	664.57	1880	115,587
Net debt	4,969,750	1890	204,468
Per capita	24.35		
Tax per $100	2.70		

The population of Milwaukee by the census of 1890 was 204,468. The site of the city is known to have been a trading post at least as early as 1757. The first white settler, a Frenchman, is supposed to have landed here in 1818. The land was ceded by the Indians in 1835, but they reserved the right to occupy it three years longer. In 1835 there was a large influx of adventurers and traders, and building began in earnest. In 1836 there was a population of over 500. The financial crisis of 1837 counted the Milwaukee speculators among its sufferers. "Many a lot for which the owner had paid $500 or even $1,000 in 1836, was in 1837 or 1838 given in exchange for a barrel of pork or flour or a suit of clothes." Only those who were too poor to get away remained in the place. When a great land sale was held in 1839 it became clear that progress had received only a temporary check. Within

five weeks $600,000 of property was sold. Nine tenths of the land was bought by settlers; no speculator got an acre of claim lands at this sale. No "land shark" dared bid more than the Government price of $1.25 per acre. The few who attempted it were ducked until they desisted.

The history of the city for the past half century has been one of almost uninterrupted prosperity.

In 1890 Milwaukee had 2,879 manufacturing establishments, with a capital of $69,145,814; they employed an average of 43,423 hands; the wages paid amounted to $20,646,717; the raw materials cost $55,815,485; and the value of products was $97,503,951. The average capital was $24,017; the average wages, $475; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $28,000.

Cities having from One Hundred Thousand to Two Hundred Thousand Inhabitants.

NEWARK, N. J.

Latitude	40° 44′ N.
Longitude	74° 10′ W.
Altitude	0 to 230 feet.
Valuation	$129,698,003
Per capita	713.29
Net debt	12,248,000
Per capita	67.36
Tax per $100	1.82

Population:	
1820	6,507
1830	10,953
1840	17,290
1850	38,894
1860	71,941
1870	105,059
1880	136,508
1890	181,830

Newark had, according to the census of 1890, a population of 181,830. Its existence as a large city is due to its relations with New York, of which it is chiefly a manufacturing and residence suburb. It was settled about 1666. In 1681 it had a population of 500, and 10,000 acres of town lands. In 1713 Queen Anne granted it a charter. The census of 1806 showed about 8,000 inhabitants. It was incorporated as a city in 1836.

In 1890 Newark had 2,490 manufacturing establishments, with a capital of $62,552,752; they employed an average of 46,848 hands; the wages paid amounted to $26,857,170; the raw materials cost $46,020,536; and the value of products was $93,476,652. The average capital was $25,122; average wages, $573; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $30,775.

MINNEAPOLIS, MINN.

		Population:	
Latitude	44° 58′ N.	1860	2,564
Longitude	93° 15′ W.	1870	13,066
Average altitude	838.5 feet.	1880	46,887
Valuation	$141,307,716	1890	164,738
Per capita	857.77		
Net debt	6,684,640		
Per capita	40.58		
Tax per $100	2.10		

Minneapolis had, by the census of 1890, a population of 164,738. This city owes its importance largely to the Falls of St. Anthony, about which it is built. The water power was first utilized in 1822. The first permanent settlement was in 1838. The dam was completed in 1848. In 1853 there were about a dozen houses. It was incorporated with St. Anthony, forming one city, in 1873.

In 1890 Minneapolis had 2,723 manufacturing establishments, with a capital of $42,643,764. They employed an average of 27,792 hands; the wages paid amounted to $15,254,175; the raw materials cost $54,592,210; and the value of products was $82,922,974. Flour and lumber are its chief products. The average capital was $15,661; average wages were $549; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $26,590.

Its population shows the marvelous increase for the decade of 251 per cent, and the increase of its great industries is in corresponding ratio.

JERSEY CITY, N. J.

		Population:	
Latitude	40° 43′ N.	1840	3,072
Longitude	74° 1′ W.	1850	6,856
Altitude	0 to 170 feet.	1860	29,226
Valuation	$85,100,000	1870	82,546
Per capita	522.07	1880	120,722
Net debt	17,463,918.31	1890	163,003
Per capita	107.14		
Tax per $100	2.75		

Jersey City had, according to the census of 1890, a population of 163,003.

In even a greater degree than Newark, Jersey City is a mere branch of the great community constituting the metropolis of which New York is the center. The first organized settlement

of its area was in 1660. It was incorporated as a city in 1820. In 1802 the entire population did not exceed 1,500. After 1840 its growth became rapid, the increase between 1850 and 1860 being 326 per cent.

In 1890 Jersey City had 726 manufacturing establishments, with a capital of $18,165,094; they employed an average of 12,869 hands; the wages paid amounted to $7,808,270; the raw materials cost $23,206,834; and the value of products was $37,376,322. The average capital was $25,021; average wages, $607; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $44,222.

LOUISVILLE, KY.

		Population:			
Latitude	38° 15′ N.				
Longitude	85° 50′ W.	1800...	359	1870...	100,753
Average altitude	456.5 feet.	1810...	1,357	1880...	123,758
Valuation	$90,000,000	1820...	4,012	1890...	161,129
Per capita	558.56	1830...	10,341		
Net debt	8,559,500	1840...	21,210		
Per capita	53.12	1850...	43,194		
Tax per $100	2.17	1860...	68,033		

By the census of 1890 Louisville had a population of 161,129. Its first settlement was made in 1778. It was incorporated as a city in 1828, with a population of about 10,000. Its subsequent growth has been rapid and steady.

Louisville lies at the upper end of "the Falls of the Ohio," where Bear Grass Creek enters the river. Except in extremely dry seasons, when boats can not even pass the canal, navigation is always open. In high stages of the river the falls almost disappear, and steamboats pass over them; but when low, it flows foaming down for its whole width. The canal, constructed to obviate the obstruction to navigation, is two and a half miles long, cut mainly through rock, on the Kentucky side. It was a work of vast labor, and cost about $100,000.

In 1890 Louisville had 1,700 manufacturing establishments, with a capital of $36,086,985; they employed an average of 27,198 hands; the wages paid amounted to $12,372,871; the raw materials used cost $28,033,840; and the value of products was $54,515,226. The average capital was $21,228; average wages, $455; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was $25,042.

OMAHA, NEB.

Latitude	41° 15′ N.
Longitude	95° 56′ W.
Altitude	947 to 1,094 feet.
Valuation	$20,464,116
Per capita	145.70
Net debt	3,011,100
Per capita	21.44
Tax per $100	4.10

Population:	
1860	1,883
1870	16,083
1880	30,518
1890	140,452

By the census of 1890 Omaha had a population of 140,452. The area of the town was surveyed in 1854. Two years later it had already begun to take on a rapid growth. Early in the next year it had a population of 1,500, and was incorporated as a city. It became the starting point of the Union Pacific Railroad, on which work was begun near the end of 1863, its growth receiving a check with the financial difficulties of 1873. Since 1880 it has grown at the rate of 360 per cent, the largest record in that decade for any of the fifty principal cities.

In 1890 Omaha had 675 manufacturing establishments, with a capital of $18,319,594; they employed an average of 9,414 hands; the wages paid amounted to $6,115,294; the raw materials used cost $29,260,102; the value of products was $42,339,321. The average capital was $27,140; average wages, $650; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was $54,036.

ROCHESTER, N. Y.

Latitude	43° 8′ N.
Longitude	77° 40′ W.
Altitude	
Valuation	$103,891,292
Per capita	775.91
Net debt	6,700,000
Per capita	50.04
Tax per $100	1.59

Population:	
1830	9,207
1840	20,191
1850	36,403
1860	48,204
1870	62,386
1880	89,366
1890	133,896

By the census of 1890 Rochester had a population of 133,896. The settlement of Rochester dates from the year 1812. Its important growth began with the construction of the Erie Canal, at the opening of which, in 1825, it had reached a population of 5,273. This was nearly doubled in the next five years. The city was incorporated in 1834. The business portion of the city was

nearly destroyed by a flood in 1865. It has been measurably protected, by its better construction, from a repetition of this calamity, and is now a fine town of much importance.

In 1890 Rochester had 1,892 manufacturing establishments, with a capital of $46,301,058; they employed an average of 32,720 hands; the wages paid amounted to $16,819,566; the raw materials cost $33,320,398; the value of products was $65,091,156. The average capital was $24,472; average wages, $514; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $27,969.

ST. PAUL, MINN.

		Population:	
Latitude	44° 56′ N.		
Longitude	93° 5′ W.	1850	1,112
Altitude	800 feet.	1860	10,401
Valuation	$125,239,589	1870	20,030
Per capita	940.55	1880	41,473
Net debt	8,451,965	1890	133,156
Per capita	63.47		
Tax per $100	2.00		

By the census of 1890 St. Paul had a population of 133,156. It lies mainly on the left bank of the Mississippi River, eight miles below Minneapolis, with which it has recently been connected by an electric road. There are already indications of a practical coalescing of the two cities.

St. Paul was laid out in 1847. Two years later it became the capital of the new Territory of Minnesota. It had not over two hundred inhabitants. In 1855 it had a population of nearly five thousand. It made great strides between the end of the war and the panic of 1873, which utterly prostrated it. No marked activity was experienced until 1879. By the census of 1860 fully one third of the foreign-born population were Germans. Its most marvelous growth (221 per cent) occurred between 1880 and 1890. The only statistics available are those of the earlier period, and are now of only historic interest.

In 1890 St. Paul had 1,442 manufacturing establishments, with a capital of $22,501,211; they employed an average of 18,558 hands; the wages paid amounted to $10,373,396; the raw materials cost $15,867,573; the value of products was $33,035,073. The average capital was $15,604; average wages, $559; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $19,134.

KANSAS CITY, MO.

		Population:	
Latitude	39° 5′ N.	1860	4,418
Longitude	94° 40′ W.	1870	32,260
Altitude	647 to 860 feet.	1880	55,785
Valuation	$64,792,975	1890	132,715
Per capita	488.21		
Net debt	880,500		
Per capita	6.63		
Tax per $100	1.20		

By the census of 1890 Kansas City had a population of 132,715; of these, 13,048 are in a district recently declared to be outside of the city limits. While the surrounding country began to be settled about 1825, the city dates back to 1846 only, and there was little growth until 1857. The first railroad reached the city in 1865, and growth was very rapid up to the panic of 1873. Depression continued until 1879. The basis of its wealth lies mainly in its relations to the live-stock trade of the Southwest.

In 1890 Kansas City had 234 manufacturing establishments, with a capital of $11,629,703; they employed an average of 7,333 hands; the wages paid amounted to $4,107,373; the raw materials cost $34,236,637; the value of products was $44,079,389. The average capital was $49,700; average wages, $560; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $166,845.

PROVIDENCE, R. I.

		Population:			
Latitude	41° 50′ N.	1800	7,614	1870	68,904
Longitude	71° 24′ W.	1810	10,071	1880	104,857
Altitude	3 to 202 feet.	1820	11,767	1890	132,146
Valuation	$159,812,560	1830	16,833		
Per capita	1,209.36	1840	23,171		
Net debt	11,787,921.96	1850	41,513		
Per capita	89.20	1860	50,666		
Tax per $100	1.60				

By the census of 1890 Providence had a population of 132,146.

Providence was founded by Roger Williams in 1636. The people turned their attention to manufactures immediately after the Revolutionary War. The first cotton-manufacturing company was formed in 1787. By the census of 1820 Providence had five cotton mills, two woolen mills, two bleaching establishments, three dye houses, one gin distillery, and four rum distilleries.

Street view in Denver.

It has always maintained its position in the manufacture of textile fabrics, and is now one of the most important manufacturing towns in New England.

In 1890 Providence had 1,934 manufacturing establishments, with a capital of $61,133,598; they employed an average of 42,124 hands. The wages paid amounted to $20,793,399; the raw materials cost $39,794,241; the value of products was $77,467,283. The average capital was $31,610; average wages, 494; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $33,224.

DENVER, COL.

Latitude	39° 45′ N.
Longitude	105° 0′ W.
Altitude	5,250 feet.
Valuation	$360,000,000
Per capita	3,373.53
Net debt	1,884,500
Per capita	17.87
Tax per $100	1.57

Population:	
1860	4,749
1870	4,759
1880	35,629
1890	106,713

Denver lies on the South Platte River, fifteen miles east of the base of the Rocky Mountains, near Pike's Peak. It occupies a series of plateaus rising as they recede from the river. Its elevation above the sea level varies from 5,250 to 5,375 feet. The temperature tables of the Smithsonian Institution give it a mean annual temperature of 48.13°, ranging from 26.57° in January to 72.86° in July.

By the census of 1890 Denver had a population of 106,713. The city was founded in 1858. Its growth since 1870 has been continuous and most marvelous. The population was doubled between 1880 and 1890. It has 756 miles of streets, all unpaved. The street area occupies 73.9 per cent of the total area of the city. By way of comparison, it may be stated that the percentage in New York is only 16.5 per cent.

In 1890 Denver had 762 manufacturing establishments, with a capital of $16,811,868; they employed an average of 10,613 hands; the wages paid amounted to $8,377,520; the raw materials cost $14,216,549; the value of products was $29,240,747. The average capital was $22,063; average wages, $789; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $30,975.

INDIANAPOLIS, IND.

		Population:	
Latitude	39° 47′ N.	1840	2,692
Longitude	86° 9′ W.	1850	8,091
Altitude	691 to 753 feet.	1860	18,611
Valuation	$103,547,925	1870	48,244
Per capita	982.09	1880	75,056
Net debt	1,884,500	1890	105,436
Per capita	17.87		
Tax per $100	1.57		

By the census of 1890 Indianapolis had a population of 105,436. The city was laid out in 1821. The central street of the city, 120 feet wide, was a part of the great "National Road." Until 1847 the growth was very slow. The completion of the Madison and Indianapolis Railroad turned the tide in its favor. The population doubled within four years. Other railroads were built rapidly, and the city received no further great check save during the civil war. It is an important center for the distribution of corn and pork products.

In 1890 Indianapolis had 1,189 manufacturing establishments, with a capital of $15,266,685; they employed an average of 18,061 hands; the wages paid amounted to $8,854,812; the raw materials cost $21,247,116; the value of products was $36,426,974. The average capital was $12,840; average wages, $490; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $26,087.

ALLEGHENY, PA.

		Population:	
Latitude	40 27′ N.	1830	2,801
Longitude	80° 0′ W.	1840	10,089
Altitude	722 to 1,368 feet.	1850	21,262
Valuation	$71,918,000	1860	28,702
Per capita	683.07	1870	53,180
Net debt	1,694,077.89	1880	78,682
Per capita	16.09	1890	105,287
Tax per $100	1.10		

By the census of 1890 Allegheny had a population of 105,287. From the point of view of social statistics Allegheny is really so much of Pittsburg as lies on the other side of the Allegheny River. It is favorably situated for manufactures. It was incorporated as a city in 1840, and its population doubled during the next ten years.

In 1890 Allegheny had 675 manufacturing establishments, with a capital of $22,253,243; they employed an average of 13,063 hands; the wages paid amounted to $7,081,529; the raw materials cost $14,231,758; the value of products was $26,878,979. The average capital was $32,968; the average wages, $542; and the average outlay in wages, materials, and interest on capital employed (at six per cent) was about $33,553.

It is only for want of space that a detailed statement of the condition of cities smaller than 100,000 population is not given. The tables appended hereto give the more essential population statistics of cities of 25,000 inhabitants and over.

These tables are taken from the preliminary report of the eleventh census of the United States:

A.—*Cities and Towns having a Population of 25,000 and over in 1890, arranged alphabetically, with Increase since 1880.*

Cities and Towns.	Population.		Increase.	
	1890.	1880.	Number.	Per cent.
Akron, Ohio	27,601	16,512	11,089	67.16
Albany, N. Y	94,923	90,758	4,165	4.59
Allegheny, Pa.	105,287	78,682	26,605	33.81
Allentown, Pa.	25,228	18,063	7,165	39.67
Altoona, Pa.	30,337	17,710	10,627	53.92
Atlanta, Ga.	65,533	37,409	28,124	75.18
Auburn, N. Y.	25,858	21,924	3,934	17.94
Augusta, Ga.	33,300	21,891	11,409	52.12
Baltimore, Md.	434,439	332,313	102,126	30.73
Bay City, Mich.	27,839	20,693	7,146	34.53
Binghamton, N. Y.	35,005	17,317	17,688	102.14
Birmingham, Ala.	26,178	3,086	23,092	748.28
Boston, Mass.	448,477	362,839	85,638	23.60
Bridgeport, Conn.	48,866	27,643	21,223	76.78
Brockton, Mass.	27,294	13,608	13,686	100.57
Brooklyn, N. Y.	806,343	566,663	239,680	42.30
Buffalo, N. Y.	255,664	155,134	100,530	64.80
Cambridge, Mass.	70,028	52,669	17,359	32.96
Camden, N. J.	58,313	41,659	16,654	39.98
Canton, Ohio	26,189	12,258	13,931	113.65
Charleston, S. C.	54,955	49,984	4,971	9.95
Chattanooga, Tenn.	29,100	12,892	16,208	125.72
Chicago, Ill.	1,099,850	503,185	596,665	118.58
Chelsea, Mass.	27,909	21,782	6,127	28.13
Cincinnati, Ohio.	296,908	255,139	41,769	16.37
Cleveland, Ohio.	261,353	160,146	101,207	63.20
Columbus, Ohio.	88,150	51,647	36,503	70.68
Covington, Ky.	37,371	29,720	7,651	25.74
Dallas, Tex.	38,067	10,358	27,709	267.51
Davenport, Iowa	26,872	21,831	5,041	23.09
Dayton, Ohio	61,220	38,678	22,542	58.28
Denver, Col.	106,713	35,629	71,084	199.51
Des Moines, Iowa.	50,093	22,408	27,685	123.55

Cities and Towns.	Population.		Increase.	
	1890.	1880.	Number.	Per cent.
Detroit, Mich.	205,876	116,340	89,536	76.96
Dubuque, Iowa	30,311	22,254	8,057	36.20
Duluth, Minn	33,115	3,483	29,632	850.76
Elizabeth City, N. J.	37,764	28,229	9,535	33.78
Elmira, N. Y.	29,708	20,541	9,167	44.63
Erie, Pa.	40,634	27,737	12,897	46.50
Evansville, Ind.	50,756	29,280	21,476	73.35
Fall River, Mass.	74,398	48,961	25,437	51.95
Fort Wayne, Ind.	35,393	26,880	8,513	31.67
Galveston, Tex.	29,084	22,248	6,836	30.73
Grand Rapids, Mich.	60,278	32,016	28,262	88.27
Harrisburg, Pa.	39,385	30,762	8,623	28.03
Hartford, Conn.	53,230	42,015	11,215	26.69
Haverhill, Mass.	27,412	18,472	8,940	48.40
Hoboken, N. J.	43,648	30,999	12,649	40.80
Holyoke, Mass.	35,637	21,915	13,722	62.61
Houston, Tex.	27,557	16,513	11,044	66.88
Indianapolis, Ind.	105,436	75,056	30,380	40.48
Jersey City, N. J.	163,003	120,722	42,281	35.02
Kansas City, Kan.	38,316	3,200	35,116	1,097.38
Kansas City, Mo.	* 132,716	55,785	76,931	137.91
La Crosse, Wis.	25,090	14,505	10,585	72.97
Lancaster, Pa.	32,011	25,769	6,242	24.22
Lawrence, Mass.	44,654	39,151	5,503	14.06
Lincoln, Neb.	55,154	13,003	42,151	324.16
Little Rock, Ark.	25,874	13,138	12,736	96.94
Long Island City, N. Y.	30,506	17,129	13,377	78.10
Los Angeles, Cal.	50,395	11,183	39,212	350.64
Louisville, Ky.	161,129	123,758	37,371	30.20
Lowell, Mass.	77,696	59,475	18,221	30.64
Lynn, Mass.	55,727	38,274	17,453	45.60
Manchester, N. H.	44,126	32,630	11,496	35.23
Memphis, Tenn.	64,495	33,592	30,903	92.00
Milwaukee, Wis.	204,468	115,587	88,881	76.90
Minneapolis, Minn.	164,738	46,887	117,851	251.35
Mobile, Ala.	31,076	29,132	1,944	6.67
Nashville, Tenn.	76,168	43,350	32,818	75.70
Newark, N. J.	181,830	136,508	45,322	33.20
New Bedford, Mass.	40,733	26,845	13,888	51.73
New Haven, Conn.	81,298	62,882	18,416	29.29
New Orleans, La.	242,039	216,090	25,949	12.01
New York, N. Y.	1,515,301	1,206,299	309,002	25.62
Norfolk, Va.	34,871	21,966	12,905	58.75
Oakland, Cal.	48,682	34,555	14,127	40.88
Omaha, Neb.	140,452	30,518	109,934	360.23
Paterson, N. J.	78,347	51,031	27,316	53.53
Pawtucket, R. I.	27,633	19,030	8,603	45.21
Peoria, Ill.	41,024	29,259	11,765	40.21
Philadelphia, Pa.	1,046,964	847,170	199,794	23.58
Pittsburg, Pa.	238,617	156,389	82,228	52.58
Portland, Me.	36,425	33,810	2,615	7.73
Portland, Ore.	46,385	17,577	28,808	163.90
Providence, R. I.	132,146	104,857	27,289	26.02
Quincy, Ill.	31,494	27,268	4,226	15.50

* Includes 13,048 population which by recent decision of the Missouri State Supreme Court is now outside of the limits of Kansas City.

Cities and Towns.	Population.		Increase.	
	1890.	1880.	Number.	Per cent.
Reading, Pa	58,661	43,278	15,383	35.54
Richmond, Va	81,388	63,600	17,788	27.97
Rochester, N. Y	133,896	89,366	44,530	49.83
Sacramento, Cal	26,386	21,420	4,966	23.18
Saginaw, Mich	46,322	29,541	16,781	56.81
St. Joseph, Mo	52,324	32,431	19,893	61.34
St. Louis, Mo	451,770	350,518	101,252	28.89
St. Paul, Minn	133,156	41,473	91,683	221.07
Salem, Mass	30,801	27,563	3,238	11.75
Salt Lake City, Utah	44,843	20,768	24,075	115.92
San Antonio, Tex	37,673	20,550	17,123	83.32
San Francisco, Cal	298,997	233,959	65,038	27.80
Savannah, Ga	43,189	30,709	12,480	40.64
Scranton, Pa	75,215	45,850	29,365	64.05
Seattle, Wash	42,837	3,533	39,304	1,112.48
Sioux City, Iowa	37,806	7,366	30,440	413.25
Somerville, Mass	40,152	24,933	15,219	61.04
Springfield, Mass	44,179	33,340	10,839	32.51
Springfield, Ohio	31,895	20,730	11,165	53.86
Syracuse, N. Y	88,143	51,792	36,351	70.19
Tacoma, Wash	36,006	1,098	34,908	3,179.23
Taunton, Mass	25,448	21,213	4,235	19.96
Terre Haute, Ind	30,217	26,042	4,175	16.03
Toledo, Ohio	81,434	50,137	31,297	62.42
Topeka, Kan	31,007	15,452	15,555	100.67
Trenton, N. J	57,458	29,910	27,548	92.10
Troy, N. Y	60,956	56,747	4,209	7.42
Utica, N. Y	44,007	33,914	10,093	29.76
Washington, D. C	230,392	177,624	52,768	29.71
Waterbury, Conn	28,646	17,806	10,840	60.88
Wheeling, W. Va	35,013	30,737	4,276	13.91
Wilkesbarre, Pa	37,718	23,339	14,379	61.61
Williamsport, Pa	27,132	18,934	8,198	43.30
Wilmington, Del	61,431	42,478	18,953	44.62
Worcester, Mass	84,655	58,291	26,364	45.23
Yonkers, N. Y	32,033	18,892	13,141	69.56
Youngstown, Ohio	33,220	15,435	17,785	115.23

Note.—The statistics relating to valuation, taxation, and indebtedness of the larger cities, as stated in the tables preceding their respective descriptions, are compiled from reports the dates of which vary from December 31, 1892, to October 31, 1893, according to the close of the fiscal year.

B.—*Fifty Principal Cities in 1890 in the Order of their Rank, with the Population in 1890 and 1880, and the Increase from 1880 to 1890.*

Cities.	Population.		Increase.	
	1890.	1880.	Number.	Per cent.
New York, N. Y.	1,515,301	1,206,299	309,002	25.62
Chicago, Ill.	1,099,850	503,185	596,665	118.58
Philadelphia, Pa.	1,046,964	847,170	199,794	23.58
Brooklyn, N. Y.	806,343	566,663	239,680	42.30
St. Louis, Mo.	451,770	350,518	101,252	28.89
Boston, Mass.	448,477	362,839	85,638	23.60
Baltimore, Md.	434,439	332,313	102,126	30.70
San Francisco, Cal.	298,997	233,959	65,038	27.80
Cincinnati, Ohio.	296,908	255,139	41,769	16.37
Cleveland, Ohio.	261,353	160,146	101,207	63.20
Buffalo, N. Y.	255,664	155,134	100,530	64.80
New Orleans, La.	242,039	216,090	25,949	12.01
Pittsburg, Pa.	238,617	156,389	82,228	52.58
Washington, D. C.	230,392	177,624	52,768	29.71
Detroit, Mich.	205,876	116,340	89,536	76.96
Milwaukee, Wis.	204,468	115,587	88,881	76.90
Newark, N. J.	181,830	136,508	45,322	33.20
Minneapolis, Minn.	164,738	46,887	117,851	251.35
Jersey City, N. J.	163,003	120,722	42,281	35.02
Louisville, Ky.	161,129	123,758	37,371	30.20
Omaha, Neb.	140,452	30,518	109,934	360.23
Rochester, N. Y.	133,896	89,366	44,530	49.83
St. Paul, Minn.	133,156	41,473	91,683	221.07
Kansas City, Mo.	* 132,716	55,785	76,931	137.91
Providence, R. I.	132,146	104,857	27,289	26.02
Denver, Col.	106,713	35,629	71,084	199.51
Indianapolis, Ind.	105,436	75,056	30,380	40.48
Allegheny, Pa.	105,287	78,682	26,605	33.81
Albany, N. Y.	94,923	90,758	4,165	4.59
Columbus, Ohio.	88,150	51,647	36,503	70.68
Syracuse, N. Y.	88,143	51,792	36,351	70.19
Worcester, Mass.	84,655	58,291	26,364	45.23
Toledo, Ohio	81,434	50,137	31,297	62.42
Richmond, Va.	81,388	63,600	17,788	27.97
New Haven, Conn.	81,298	62,882	18,416	29.29
Paterson, N. J.	78,347	51,031	27,316	53.53
Lowell, Mass.	77,696	59,475	18,221	30.64
Nashville, Tenn.	76,168	43,350	32,818	75.70
Scranton, Pa.	75,215	45,850	29,365	64.05
Fall River, Mass.	74,398	48,961	25,437	51.95
Cambridge, Mass.	70,028	52,669	17,359	32.96
Atlanta, Ga.	65,533	37,409	28,124	75.18
Memphis, Tenn.	64,495	33,592	30,903	92.00
Wilmington, Del.	61,431	42,478	18,953	44.62
Dayton, Ohio.	61,220	38,678	22,542	58.28
Troy, N. Y.	60,956	56,747	4,209	7.42
Grand Rapids, Mich.	60,278	32,016	28,262	88.27
Reading, Pa.	58,661	43,278	15,383	35.54
Camden, N. J.	58,313	41,659	16,654	39.98
Trenton, N. J.	57,458	29,910	27,548	92.10

* Includes 13,048 population which by recent decision of the Missouri State Supreme Court is now outside the limits of Kansas City.

C.—*Number of Cities classified according to Population.*

Census Years.	Total.	8,000 to 12,000.	12,000 to 20,000.	20,000 to 40,000.	40,000 to 75,000.	75,000 to 125,000.	125,000 to 250,000.	250,000 to 500,000.	500,000 to 1,000,000.	1,000,000 and above.
1790.....	6	1	3	1	1	..	..	..	..	..
1800.....	6	1	..	3	2	..	..	..	..	..
1810.....	11	4	2	3	..	2	..	..	..	..
1820.....	13	3	4	2	2	2	..	..	..	..
1830.....	26	12	7	3	1	1	2	..	..	..
1840.....	44	17	11	10	1	3	1	1	..	..
1850.....	85	36	20	14	7	3	3	1	1	..
1860.....	141	62	34	23	12	2	5	1	2	..
1870.....	226	92	63	39	14	8	3	5	2	..
1880.....	286	110	76	55	21	9	7	4	3	1
1890.....	443	173	105	91	35	14	14	7	1	3

CHAPTER VI.

EDUCATION IN THE UNITED STATES.

INTRODUCTION.

EDUCATION in the United States is regarded as something organic—something belonging essentially to our political and social structure. Daniel Webster announced, in his clear and incisive manner, this necessity that appertains to the American form of government. He said: "On the diffusion of education among the people rest the preservation and perpetuation of our free institutions. I apprehend no danger to our country from a foreign foe. . . . Our destruction, should it come at all, will be from another quarter. From the inattention of the people to the concerns of the Government, from their carelessness and negligence, I confess I do apprehend some danger. I fear that they may place too implicit confidence in their public servants, and fail properly to scrutinize their conduct; that in this way they may be the dupes of designing men and become the instruments of their undoing. Make them intelligent and they will be vigilant; give them the means of detecting the wrong and they will apply the remedy."

We are making the experiment of self-government—a government of the people by the people—and it has seemed a logical conclusion to all nations of all times that the rulers of the people should have the best education attainable. Then, of course, it follows that the entire people of a democracy should be educated, for they are the rulers.

Quoting again from Webster's Plymouth oration in 1822: "By general instruction we seek as far as possible to purify the whole atmosphere, to keep good sentiments uppermost, and to turn the strong current of feeling and opinion, as well as the censures of the law and the denunciations of religion, against immorality and crime."

This necessity for education has been felt in all parts of the nation, and the whole subject is reasoned out in many a school

report published by city or State. By education we add to the child's experience the experience of the human race. His own experience is necessarily one-sided and shallow; that of the race is thousands of years deep, and it is rounded to fullness. Such deep and rounded experience is what we call wisdom.

To prevent the child from making costly mistakes we give him the benefit of seeing the lives of others. The successes and failures of one's fellow-men instruct each of us far more than our own experiments.

The school attempts to give this wisdom in a systematic manner. It uses the essential means for its work in the shape of text-books, in which the experience of the race is digested and stated in a clear and summary manner, in its several departments, so that a child may understand it. He has a teacher to direct his studies and instruct him in the proper methods of getting out of books the wisdom recorded in them. He is taught first in the primary school how to spell out the words and how to write them himself. Above all, he is taught to understand the meaning of the words. All first use of words reaches only a few of their many significations; each word has many meanings and uses, but the child gets at only one meaning, and that the simplest and vaguest, when he begins. His school work is to train him into accuracy and precision in the interpretation of language. He learns gradually to fill each word of the printed page with its proper meaning. He learns to criticise the statements he reads, and to test them in his own experience and by comparison with other records of experience.

In other words, the child at school is set to work to enlarge his own puny life by the addition of the best results of other lives. There is no other process so well adapted to insure a growth in self-respect as the mastery of the thought of the thinkers who have stored and systematized the experience of mankind.

This is the clew to the hopes founded on education. The patriotic citizen sees that a government managed by illiterate people is a government of one-sided and shallow experience, and that a government by the educated classes insures the benefits of a much wider knowledge of the wise ways of doing things.

The work of the school produces self-respect, because the pupil makes himself the measure of his fellows and grows to be equal to them spiritually by the mastery of their wisdom. Self-respect is the root of the virtues and the active cause of a career of growth in power to know and power to do. Webster called

the free public schools "a wise and liberal system of police, by which property and the peace of society are secured." He explained the effect of the school as exciting "a feeling of responsibility and a sense of character."

This, he saw, is the legitimate effect; for, as the school causes its pupils to put on the forms of thought given them by the teacher and by the books they use—causes them to control their personal impulses, and to act according to rules and regulations—causes them to behave so as to combine with others and get help from all while they in turn give help; as the school causes the pupil to put off his selfish promptings, and to prefer the forms of action based on the consideration of the interests of others—it is seen that the entire discipline of the school is ethical. Each youth educated in the school has been submitted to a training in the habit of self-control and of obedience to social order. He has become to some extent conscious of two selves: the one his immediate animal impulse, and the second his moral sense of conformity to the order necessary for the harmonious action of all.

The statistics of crime confirm the anticipations of the public in regard to the good effects of education. The jails of the country show pretty generally the ratio of eight to one as the quotas of delinquents furnished from a given number of illiterates as compared with an equal number of those who can read and write. Out of ten thousand illiterates there will be eight times as many criminals as out of ten thousand who can read and write. In a State like Michigan, for example, where less than five per cent of the people are illiterate, there are thirty per cent of the criminals in jail who are illiterate. The ninety-five per cent who are educated to read and write furnish the remaining seventy per cent. In comparing fractions, it is necessary to consider the denominators as well as the numerators. Comparing only the numerators, we should say education produces more crime than illiteracy; for here are only thirty per cent of those criminals from the illiterate class, but seventy per cent are from those who can read and write. On the other hand, taking the denominators also into consideration, we say: But there are less than five per cent illiterates and more than ninety-five of educated persons in the entire adult population. Hence the true ratio is found, by combining the two fractions, to be one eighth, or one to eight for the respective quotas furnished.

The penitentiaries, or State prisons, contain the selected criminals who have made more serious attacks on person and property

Old dormitories and chapel, Yale University.

and on the majesty of the law than those left in the jails. These, therefore, come to a larger extent from the seventy per cent of arrests which are from the educated class; and it is found, by comparing the returns of the twenty odd States that keep records of illiteracy, that the illiterates furnish about four times their quota for the prisons, while they furnish eight times their quota for the jails and houses of correction.

But it is found, on investigation, that the criminals who can read and write are mostly from the ranks bordering on illiteracy. They may be described as *barely* able to read and write, but without training in the use of those arts for acquainting themselves with the experience and wisdom of their fellowmen.*

It is against all reason and all experience that the school, whose two functions are to secure good behavior and an intelligent acquaintance with the lessons of human experience, should not do what Webster said, namely, "prevent in some measure the extension of the penal code, by inspiring a salutary and conservative principle of virtue and of knowledge in an early age."

Thus our political problem, which proposes to secure the general welfare by intrusting the management of the Government to representatives chosen by all the people, finds its solution in the establishment of schools for the people.

But with a system of schools not everything is provided; there must be a *good* system, and our account of the public and private schools of this country will have to consider at every step their efficiency in the several directions. We must inquire how the system succeeds in securing a general attendance of all the youth of school age, and what it teaches these youth while under its charge. This will lead us to the consideration of the several classes of schools, elementary, secondary, higher and special. It will involve also a discussion of the methods of discipline and instruction actually employed, and the buildings and apparatus, and the school grounds; the supervision and the governing

* A point is made that those States which have the completest systems of education have the most criminals in their jails and prisons. This is true, but its significance is not read aright until one sees by an analysis of the causes of arrest that it is not a real increase of crime, but an increase of zeal on the part of the community to abolish the seeds of crimes, to repress the vices that lead to crime. In Massachusetts, for example, there were, in 1850, 3,351 arrests for drunkenness, while in 1885 the number had increased to 18,701. But meanwhile the crimes against person and property had decreased since 1860 forty-four per cent, making allowance for increase of population. Life and property had become more safe, but drunkenness had become less safe!

boards or school committees; the financial management. The details of the school programme, too, ought to receive attention, including such matters as length of daily school sessions, the hours of recreation, the length of the school year, and the times of vacation. Very important, too, under the question of special schools, is the consideration of normal schools and institutes for the training of teachers for their work.

Under the head of special schools, too, we must consider the needs of localities for instruction in special branches by way of preparation of youth for the industries there followed.

Besides these technical matters connected with the school system there are more general relations in which all are interested. Education is a branch of sociology, and all its questions involve other considerations beyond them in society at large. For example, the social question of the aggregation of people in cities involves the question of dealing with the weakling classes that have a way of flocking together and forming "slums." This does not happen to any serious extent in rural life, but in urban life it gets to be a vital problem. The three weakling classes are the paupers, the criminals, and the demented. The slum not only collects adult criminals and paupers, but its worst feature is its increase of the class by breeding and training them. Its children grow up educated to crime and unthrift. In the slum, too, there originates other pestilence than moral pestilence; for it breeds contagious diseases, which extend beyond the boundaries of the slum districts and attack the best classes of society.

Physiological and ethical hygiene, therefore, demand that the weakling classes of society shall be looked after providentially by the wealth and power of the community for the sake of the preservation of the public weal. Sanitary regulations are a matter of general welfare.

Now, the only method of dealing effectively with this question of the slums, which grows on us with the growth of cities, is that of education—moral, intellectual, religious, and industrial. The full potency of all species of education is demanded not only in its adaptation to the several capacities of human nature, but it should reach all ages and conditions—kindergartens and infant schools, primary schools for the very young, grammar schools and high schools for the youth, evening schools for adults, enforced attendance of youth on the regular day schools, enforced attendance of criminals on schools of reform.

Our philanthropies, and the missionary activities which are the

very banner of the march of our civilization, turn more and more to the question of education.

It is seen that most forms of giving alms demoralize the receiver by weakening his power of self-help. The only gift that always promotes self-help is the moral, intellectual, religious, or industrial training given by a school.

Doubtless we are only just on the threshold as regards efficiency of methods and variety of means in this matter of reaching this problem of the abolition of crime and poverty. But we are sure that the vestibule opening into the place where this problem is to be solved opens into the school.

The Extent of our School System.

According to the most recent statistics—those for 1890—the total number attending public and private schools of the three orders, primary, secondary, and higher, was 14,512,778. This is the entire number of different pupils that attended school at any time during the year for any period, long or short. It amounts to over 23 per cent of the entire population of the country, and makes a good showing for us, inasmuch as 19 or 20 per cent is to be regarded as a first-class school enrollment. For instance, the empire of Germany enrolls as a whole a little less than 19 per cent, although some of its states, especially Saxony, Prussia, Baden, and Bavaria, have about 20 per cent each. Of the other great powers of Europe, France and Great Britain (including Ireland also) enroll each 16½ per cent; Austria-Hungary, 13; Italy, 9½; Russia, 3.

The terms "enroll" and "enrollment" are technically used in school statistics to include all the different pupils that attend school within the year for a longer or shorter time. It is, of course, always larger than the number in actual attendance at any given time, inasmuch as some die, some are absent from sickness, some remove from the locality, some are obliged to leave and take up a trade or business occupation.

A glance at the smaller European nations, to complete our comparison with the United States, shows us Spain with an enrollment of 10½ per cent; Switzerland, 19½; Holland, 14; Belgium, 13½; Sweden, 15½; Denmark, 11; Portugal, 6; Turkey, 2½.

Continuing our comparison to North America, we find the enrollment of Canada reported at 21 per cent; Mexico at 4½; Cuba at 3½; Haiti at 1; Jamaica at 12; Nicaragua at 3; Gautemala at 4.

In South America the statesmen of the several countries have

interested themselves in education in recent years, and some in the far south have engaged normal-school teachers from the United States. The most recent reports show an enrollment in Brazil of 3 per cent; in the Argentine Republic of 7; in Colombia of 2½; in Chili of 4½; in Peru of 2½; in Venezuela of 5; in Ecuador of 4½; in Bolivia of 2½; in Uruguay of 8; in Paraguay of 8.

With this comparative survey we find the United States in the lead so far as enrollment is concerned. But it is well known that there are other items to be considered in a comparison—namely, length of annual school session, regularity of attendance, and the quality of the instruction.

In the United States the actual average attendance is not quite two thirds of the entire number enrolled. The average annual session varies from 88 days in the Gulf States to 166 days in the North Atlantic States. In most of the cities it is 200 days, which is thought to be the nominal standard after deducting from the 365 days the holidays and vacations necessary for recreation. The returns show that the average attendance of our 14,500,000 is only 86 days out of the ideal 200 days that pupils in good health ought to attend. The European average would be much better than ours, in those states that are in earnest about education. Germany and France would show double our number of days' attendance for the average pupil, and Great Britain about 50 per cent more than ours.

This matter of length of school session depends on the ratio of rural to urban population in a large measure. In those States which have few and small cities the annual school session is much shorter than in the States with numerous and large cities.

The rural populations are everywhere engaged in agriculture. The youth are needed on the farm in the seasons of planting and harvesting the crops. There are seasons fixed by Nature when there is comparative rest from agricultural labor. These seasons are utilized for school, and a three months' school in the winter is the educational tradition in the country districts.

Where the country people are thriving farmers the winter school is lengthened by four months, and after a spring vacation, when the weather has become mild and pleasant, a summer school is opened for such as can attend, and these are the youngest children together with many of the girls who attended the winter school. A four months' school in the winter and a three months' school in the summer amounts to a seven months' school for the

year, but not for the same children, inasmuch as the summer enrollment is smaller than that of the winter, and at least one third of the winter pupils, including chiefly the older ones, do not attend the summer school, but are engaged in assisting at the work of the farm either indoors or in the field.

Here is found a cause of some inaccuracy as regards school statistics in the United States. In former years it was the custom to report the two enrollments separately, without deducting from the report of the summer session the number that had attended the winter session. The consequence was an excess in the numbers reported from those rural districts that supported summer schools—amounting sometimes to 20 or 30 per cent above the true figures.

I mention this difficulty here because it still exists to some extent and probably makes the enrollment reported in the agricultural States of the South and West, and to some extent the Northern Atlantic States, 5 or 10 per cent larger than it actually is.

Making this correction of one twentieth or even one tenth from the statistics above given, and we still have left an enrollment of 21 or 22 per cent of the entire population as the number that attend school during some period longer or shorter in the course of the year.

How is this matter of school enrollment distributed over the different sections of the Union?

The general average for the entire country is 23⅕ per cent of the whole population (accurately, 23.18 per cent). The North Atlantic division, including, besides the six New England States, three of the Middle (namely, New York, New Jersey, and Pennsylvania), nine States in all, have an enrollment of 20½ (20.5) per cent.

The South Atlantic division, including eight States, from Delaware to Florida (counting West Virginia in the number), and the District of Columbia, enroll 21⅔ (21.68) per cent.

The South Central division, including the Gulf States, with Arkansas, Tennessee, and Kentucky, seven in all, enroll 23½ (23.49) per cent—a wonderful increase in the two Southern divisions since 1865.

The North Central division, including Ohio and the States west and north of it to the Rocky Mountains, twelve States in all, enroll 25½ (25.48) per cent.

The Western division, including the mountainous region and

the Pacific coast, twelve States and Territories, enroll 19 (19.11) per cent.

It is hardly necessary to say to those familiar with the United States census that the proportion of children of school age to the entire population is much greater in the South and North Central than in the North Atlantic and Western divisions. The reasons are obvious: in the South the terrible strain of the civil war cut off the adult population to such an extent that the children form a much greater proportion of the whole population than is normal in a stable and peaceful people. There was first the loss on the battle-field, and the greater loss by disease. Then, of the survivors of the war a still greater number died before reaching old age, because of mental reactions due to the loss of their cause—disappointment; anxiety because of loss of property; premature old age, because of the hardships and exposure endured and survived in the period of the war.

In the North Atlantic division there is a constant migration of the young men and women to the border lands. The most prolific stocks, bearing large families of children, have already removed to the Northwestern States. The older members of the families and the least prolific stocks remain, for the obvious reason that they (the least prolific) are well provided for by the accumulated wealth at home, and do not need to seek their fortunes in the West. Moreover, the increase of comforts in the North Atlantic division causes an increase in the average length of life, and a consequent decrease in the proportion of children in the whole number.

In the North Central division there are comparatively few old people in the population, because of the recent settlement of its States. Besides, the death-rate is higher, for the reason that there is a greater drain on the life-forces among pioneers and adventurers than among quiet people who stay at home, where they have already become well adjusted to the climate and other conditions of the environment.

In the mountains of the far West there is a still more primitive stage of new settlement. The men have gone there to work the mines or to herd cattle, and the families have not yet all followed the adventurous pioneers. Hence the number of children, and of women too, is less than in the other divisions.

These are some of the sociological conditions to be considered in studying the statistics of education.

Another question has already arisen in our minds. What is

Memorial Hall, Harvard University.

the proportion enrolled in private schools? The returns show that, out of the 23.18 per cent of the entire population which is enrolled in school, 20.37 per cent attend public schools and 2.81 per cent attend private schools. This is nearly one eighth of the entire number in school.

Comparing this with the number enrolled in private schools in England, where such schools are subsidized by the Government and receive as much of the school fund per pupil as the public schools established by the municipal school boards, we find the following interesting results:

In the United States:

Private and parochial schools	12.1 per cent
Public schools	87.9 " "
Total	100

In England and Wales:

Private and parochial schools	61.39 per cent
Public (" school board ") schools	38.61 " "
Total	100

Both countries agree in tolerating private and corporate enterprise in founding and supporting schools. But England goes further than America, and Parliament actually aids private schools as much as public schools. Of course, it demands a return from the private schools in the shape of abatement of tuition charges, and since the fall of 1891 it secures absolutely free tuition from all schools that it aids.

We have one eighth of all our pupils in private schools, while England has nearly five eighths under private tuition, but with Government supervision.

The proportion in private schools is larger in the States full of wealthy cities than in the agricultural States. In the North Atlantic division nearly one sixth of the pupils are in private schools, while in the South Atlantic division only one half this ratio, or only one in twelve pupils, is enrolled in a private school. This, however, is due to some extent to the fact that the North Atlantic division has the lion's share of secondary and higher education, drawing pupils from all sections of the country. And the proportion of private institutions is much greater in secondary and higher education than in elementary (or district-school) education.

The private school provides for certain needs that the public schools can not or do not provide for in some localities. There

is a margin, therefore, for this kind of education, and it is likely to increase slightly with the increasing wealth of the country. Probably its maximum limit is somewhere in the region of sixteen per cent, or one in six, a limit already reached in some States of the North Atlantic division.

The feature of the private school that causes its increase with the increasing wealth of the country is not so much that it provides for separation of one caste from another, nor in that it provides for religious instruction within the limits of a particular denomination, but that it provides for exceptional cases. Wealthy people are able to gratify their peculiar notions as to the course of study and the kind of discipline which they desire for their children. The private school depends on private or corporate enterprise. This enterprise is on the lookout for new subjects of study, new methods of teaching, and new popular preferences in any direction. It caters for special tastes and needs, offering new devices while these are in the doubtful stage of experiment.

When the private schools have demonstrated the utility or general popularity of any new departure, the public-school boards and superintendents gradually introduce the improvements into the schools supported by taxation, and the private schools lose the pupils that had been attracted to them for those specialties. This is a wholesome feature in the private schools. It saves the bulk of the school system from wasteful experiments. The experiments are conducted in comparatively few schools and at the expense of those parents who desire to have their children receive particular kinds of instruction. Nine tenths or more of all such experiments are failures, of course. But the one tenth that succeed benefit the whole community and get adopted by the public-school system sooner or later. One need think only of the process now going on with reference to kindergartens, manual training, physical exercise, cooking schools, natural science instruction, and such new movements, that are slowly or rapidly gaining a foothold in the public schools. A glance backward shows us a like adoption from private enterprise of such branches as geography, music, drawing, calisthenics, etc.

Again, the private school is a sort of safety valve in many ways. When the school boards or school committees become niggard in providing good teachers and commodious school buildings by a sufficient outlay of money in salaries and building funds, the best teachers are drawn off into the private schools. The majority of the people see this result with uneasiness, and a change is soon

effected in the membership of the school committee by popular election.

On the other hand, capricious parents, who furnish an element of perpetual friction so long as their children are in the public schools, find what they are seeking in the private schools, and can get the requisite variety by changing from one school to another as often as they like.

Besides the check on the growth of private schools by the steady adoption of their newly invented useful devices into the public schools, there is a depletion of private secondary education by the rapid establishment of public high schools. The Bureau of Education collected statistics from all secondary schools (high schools, academies, seminaries, preparatory schools, and colleges doing secondary work) in 1891, obtaining statistics of the number actually studying branches belonging to a secondary course of study. This excluded a very large number of pupils of elementary grade that had been before returned as secondary pupils because they were on the rolls of secondary schools. It was ascertained that the number of pupils actually pursuing secondary studies is about one half as large as heretofore reported. At present there are 60 per cent of all secondary pupils in public high schools, and 40 per cent in private schools. Of the students pursuing higher education, counting only the regular colleges and universities, only one eighth are in public institutions; counting agricultural colleges, schools of medicine, law, theology, and normal schools, the private institutions still enroll 70 per cent of all the students.

In the whole country 96½ (96.54) per cent of all pupils are in the elementary grades of work, while 2½ (2.53) per cent are in secondary work, and less than 1 (0.93) per cent are receiving higher instruction (or one half that per cent if we count only the pupils in the regular academic course of the college).

One in four and a half of the population is receiving elementary instruction; one in one hundred and seventy-two is receiving secondary instruction; one in four hundred and fifty-five is receiving higher instruction.

The technical terms expressing grades of work should be defined, to give a clear idea of the above statistics.

"Elementary" instruction includes on an average about eight years' work on such studies as reading, writing, arithmetic, geography, grammar, and the history of the United States.

Secondary work includes another four years devoted to such

studies as algebra and geometry, Latin, Greek, French or German, natural philosophy ("physics"), physical geography, the natural sciences, general history, literature, and "civics."

Higher or superior instruction includes four or more years beyond the secondary instruction, and continues mathematics, the ancient and modern languages, the sciences, general and special history, logic, philosophy, ethics, and various branches that relate to the unity of human learning. The most general and pronounced characteristic of higher instruction is that it is "comparative," a study of each branch of human learning with reference to its history and to the bearing which all other branches have upon it.

Higher education has two parts—the first part the academic course of the college, for the degree of A. B.; and the second part, the course of specialized investigation. In the second part, called "post-graduate" work, and including also the work of all professional schools, the student undertakes original work under the supervision of the professors in charge of the department and prepares a thesis for the doctor's degree. The "laboratory" and the "seminary," are used in this advanced course. The word "seminary," borrowed from the German "*Seminar*," refers especially to library work and the use of the records of observation and reflection recorded on the printed page; a discussion of results with fellow-pupils, and with the teacher who conducts the "seminary." The "laboratory" refers to actual experiments conducted by the student himself.

The following is a table showing the details of enrollment in the public schools for the three epochs 1870, 1880, 1890 (taken from the annual report of the Bureau of Education for 1890). The reader will notice that this does not include the private-school statistics.

Pupils enrolled in the Common Schools in 1870, 1880, and 1890.

State or Territory.	Number of different pupils enrolled in the common schools.			Percentage of the total population enrolled.		
	1870.	1880.	1890.	1870.	1880.	1890.
The United States.....	6,871,522	8,767,505	12,697,196	17.82	19.67	20.27
North Atlantic Division.	2,717,233	2,930,345	3,112,622	22.09	20.20	17.89
South Atlantic Division.	366,322	1,242,811	1,746,751	6.26	16.36	19.72
South Central Division..	482,185	1,371,975	2,306,929	7.49	15.38	21.02
North Central Division..	3,168,946	4,033,828	5,015,217	24.41	23.23	22.43
Western Division.....	136,836	288,546	515,677	13.82	16.32	17.03

State or Territory.	Number of different pupils enrolled in the common schools.			Percentage of the total population enrolled.		
	1870.	1880.	1890.	1870.	1880.	1890.
North Atlantic Division:						
Maine	* 152,400	149,827	139,676	* 24.31	23.09	21.13
New Hampshire †	69,762	64,341	59,813	21.92	18.54	15.89
Vermont	‡ 66,310	75,238	‡ 65,608	‡ 20.66	22.64	‡ 19.74
Massachusetts	* 269,000	306,777	371,492	* 18.46	17.20	16.59
Rhode Island	* 32,100	40,604	52,774	* 14.76	14.68	15.27
Connecticut	110,640	119,694	126,505	20.58	19.22	16.95
New York	1,026,447	1,031,593	1,042,160	23.42	20.32	17.37
New Jersey	161,683	204,961	234,072	17.84	18.54	16.20
Pennsylvania	828,891	937,310	1,020,522	23.53	21.89	19.41
South Atlantic Division:						
Delaware	19,018	27,823	21,434	15.21	18.98	18.66
Maryland	100,992	162,431	184,351	12.93	17.37	17.68
District of Columbia	* 14,300	26,439	36,906	* 10.86	14.88	16.02
Virginia	* 17,400	220,736	342,269	* 1.42	14.59	20.67
West Virginia	87,330	142,850	193,064	19.76	23.09	25.31
North Carolina	* 68,000	252,612	322,533	* 6.35	18.05	19.93
South Carolina	* 38,000	134,072	201,260	* 5.38	13.46	17.49
Georgia	11,150	236,533	# 342,562	0.94	15.34	# 19.00
Florida	10,132	39,315	92,472	5.40	14.59	23.63
South Central Division:						
Kentucky	‖ 169,477	‖ 276,090	408,966	12.83	16.74	22.00
Tennessee	* 100,000	390,217	447,950	* 7.94	19.92	25.34
Alabama	* 68,000	179,490	301,615	* 6.82	14.22	19.93
Mississippi	△	236,654	325,862	△	20.91	25.27
Louisiana	* 36,800	77,642	# 132,593	* 5.06	8.26	# 12.09
Texas	△	220,000	466,872	△	13.82	20.88
Arkansas	107,908	81,972	223,071	22.27	10.21	19.77
North Central Division:						
Ohio	717,902	729,499	797,439	26.93	22.81	21.72
Indiana	462,527	511,283	512,955	27.52	25.85	23.40
Illinois	652,715	704,041	778,319	25.70	22.88	20.34
Michigan	278,686	362,556	427,032	23.50	22.15	20.39
Wisconsin	267,891	299,457	351,723	25.40	22.77	20.84
Minnesota	110,590	180,248	280,960	25.16	23.09	21.58
Iowa	320,803	426,057	493,267	26.87	26.22	25.79
Missouri	280,473	482,986	620,314	16.29	22.27	23.15
North Dakota	* 1,350	13,718	35,543	*9.52	10.15	19.45
South Dakota			78,043			23.74
Nebraska	12,791	92,549	240,300	10.40	20.46	22.69
Kansas	63,218	231,434	399,322	17.35	23.23	27.98
Western Division:						
Montana	1,544	4,270	16,980	7.50	19.90	12.85
Wyoming	175	2,907	7,052	1.92	13.98	11.62
Colorado	3,430	22,119	65,490	8.60	11.38	14.88
New Mexico	188	4,755	18,215	0.20	3.98	11.86
Arizona	△	4,212	7,989	△	10.42	13.40
Utah	* 16,000	24,326	37,279	* 18.44	16.90	17.93
Nevada	2,883	9,045	7,387	6.78	14.53	16.14
Idaho	1,048	5,834	14,311	6.99	17.89	16.95
Washington	4,760	14,780	55,964	19.87	19.68	16.02
Oregon	* 21,000	37,533	63,254	* 23.09	21.47	20.16
California	85,808	158,765	221,756	15.31	18.36	18.36
Alaska	.....	.....	.....	.....	.....	.....

* Approximately. † Number of pupils attending two weeks or more.

‡ Includes pupils of legal school age only. # In 1889.

‖ Highest number enrolled at any one time. △ Public-school system not yet established.

The following from the same report shows the details of the grading of all pupils, public and private:

	Pupils receiving ELEMENTARY instruction ("primary" and "grammar" grades).		Pupils receiving SECONDARY instruction ("high-school" grade).*		Pupils receiving HIGHER instruction.								
					In universities and colleges (for men exclusively, and coeducational).†			In colleges for women only (private).†	In normal schools.#			In agricultural and mechanical colleges (public).△	In schools of medicine, law, and theology (private).
	Public.	Private (largely estimated).	Public.	Private (in preparatory schools, academies, seminaries, etc.).	Public.‡	Private.	Total.		Public.	Private.‖	Total.		
The United States	12,494,233	1,516,300	221,522	145,481	7,071	39,060	46,131	11,992	26,775	8,189	34,964	6,349	35,806
North Atlantic Division..	3,034,980	534,500	83,630	40,957	675	14,326	15,001	2,544	11,947	.....	11,947	2,284	13,905
South Atlantic Division..	1,737,548	131,300	12,459	22,161	837	4,279	5,116	3,966	1,914	485	2,399	853	4,603
South Central Division ..	2,298,111	221,900	11,820	26,547	929	5,311	6,240	3,754	2,194	823	3,017	1,174	3,855
North Central Division ..	4,914,571	586,300	105,582	40,855	3,905	14,119	18,024	1,699	9,532	6,706	16,238	1,810	12,601
Western Division	509,023	42,300	8,031	14,961	725	1,025	1,750	29	1,188	175	1,363	228	842

* Including pupils in preparatory or academic departments of higher institutions.

† Excluding pupils in preparatory or academic departments; excluding also those in professional schools who are included in the last column.

‡ Mainly in State universities.

Excluding all but pupils in normal departments.

‖ Private normal schools are, with one or two exceptions, scarcely superior to the ordinary secondary schools.

△ These figures do not include all the pupils who are beneficiaries of the land-grant act. The statistics of some of the land-grant schools can not be separated from the general statistics of the colleges or universities of which they are departments.

Retrospective.

All who become interested in the system of education prevailing in the United States and see the direct bearing it has on the realization of the idea of self-government, feel an interest in the question of its origin. Anything is best understood when seen in the perspective of its history. We see not only what is present before us, but its long trend hitherward. By its course in the past we learn the sequence of its phases and can shrewdly judge of its future. If popular education is of mushroom growth—if its history is of to-day, and not of yesterday also—then it is not likely to hold its place to-morrow. If education has been seen long ago to be necessary in a free government, and if this idea has been progressively realized by our forefathers; if its realization on the part of some has produced prosperity; if the failure to realize it on the part of others has resulted disastrously—then we may be sure that to popular education belongs the future.

The beginnings of popular education are by some found with the Greeks; by others with the Egyptians, or the Chinese, or the Israelites. The Greek children committed to memory the poetry of Homer, and in the second book of the Iliad learned what was necessary to know of geography in those times. What they could make out of the geography of the Odyssey it is difficult to say. The Egyptians had an industrial and religious education, and it would seem that a knowledge of hieroglyphics must have been quite common among Egyptian artisans, or else they could not have cut them in stone. Where human speech is preserved in inscriptions that are exposed on all occasions to public view, it would seem that some knowledge of the art of reading would become pretty general. The Chinese have long had a system of writing, in which each character represents a word; and the custom of educating all classes to read is of unknown antiquity.

Curious scholars have explored and recorded the manner of education of each people; for each people has some way of initiating its youth into the manners and customs and intellectual beliefs which constitute the warp and the woof of its civilization. The bulk of all education is performed by the family in all ages. The lessons in the care for the person; the conventional forms of eating and drinking; behavior toward strangers and toward one's relations; the mother tongue; the stock of beliefs and such habits of scientific observation as may exist in the community; the ideals of life; the duties of a citizen; the consciousness of nationality,

and the sentiment of patriotism that depends on it; the elementary arts and trades, such as exist within the home—all these things are learned within the family. But letters and science are usually taught, if taught at all, by a teacher set apart for the work, and his department is called the school.

The school is the auxiliary institution founded for the purpose of re-enforcing the education of the four fundamental institutions of civilization. These are the family, civil society (devoted to providing for the wants of food, clothing, and shelter), the state, the church. The characteristic of the school is that it deals with the means necessary for the acquirement, preservation, and communication of intelligence—the mastery of letters and mathematical symbols; of the technical terms used in geography, and grammar, and the sciences; the conventional meaning of the lines used on maps to indicate water, or mountains, or towns, or latitude, or longitude, and the like. The school devotes itself to instructing the pupil in these dry details of art that are used to record systematic knowledge. These conventionalities once learned, the youth has acquired the art of self-help; he can of his own effort open the door and enter the treasure-house of literature and science. Whatever his fellow-men have done and recorded he can now learn by sufficient diligence of his own.

The difference between the part of education acquired within the family and that acquired in the school is immense and incalculable. The family arts and trades, manners and customs, habits and beliefs, have formed a sort of close-fitting spiritual vesture—a garment of the soul, always worn, and expressive of the native character, not so much of the individual as of his tribe, or family, or community. He, the individual, had from birth been shaped into these things as by a mold; all his thinking and willing and feeling has been molded into the form or type of humanity looked upon as the ideal by his parents and acquaintances.

This close-fitting garment of habit has given him direction, but not self-direction or freedom. He does what he does blindly, from the habit of following custom and doing as others do.

But the school gives a different sort of training; its discipline is for the freedom of the individual. The education of the family is in use and wont, and it *trains* rather than *instructs*. Its result is unconscious habit and ungrounded prejudice or inclination. Its likes and dislikes are not grounded in reason, but are unconscious results of early training. But the school lays all its stress on producing a consciousness of the grounds and reasons for

University of Virginia.

things. I should not say *all* its stress; for the school does, in fact, lay much stress on what is called discipline—on habits of alert and critical attention, on regularity and punctuality, on self-control and politeness. But the bare mention of these elements of discipline shows that they too are of a higher order than the habits of the family, inasmuch as they all require the exertion of both will and intellect consciously in order to attain them. The discipline of the school forms a sort of conscious superstructure to the unconscious basis of habits which have been acquired in the family.

School instruction, on the other hand, is given to the acquirement of techniques: the technique of reading and writing; of mathematics; of grammar, geography, history, literature, and science in general.

One is astonished, when he reflects upon it at first, to see how much is meant by this word *technique*. All products of human reflection are defined and preserved by words used in a technical sense. The words are taken out of their colloquial sense, which is a loose one, except when employed as slang; for slang is a spontaneous effort in popular speech to form technical terms.

The technical or conventional use of signs and symbols enables us to write words and to record mathematical calculations; the technical use of words enables us to express clearly and definitely the ideas and relations of all science. Outside of technique all is vague hearsay. The fancy pours into the words it hears such meanings as its feelings prompt. Instead of science there is superstition.

The school deals with technique in this broad sense of the word. The mastery of this technique of reading, writing, arithmetic, geography, and history lifts the pupil on to a plane of freedom and self-help hitherto not known to him. He can now by his own effort master for himself the wisdom of the race.

By the aid of such instruments as the family education has given him he can not master the wisdom of the race, but only pick up a few of its results, such as the customs of his community preserve. By the process of hearsay and oral inquiry it would take the individual a lifetime to acquire what he can get in six months by aid of the instruments which the school places in his hands; for the school gives the youth the tools of thought.

In a history of education, therefore, we should sharply discriminate between the unconscious education acquired from the four cardinal institutions—family, civil society, state, and church—

and the education in the school; for the function of the school *par excellence* is to nurture self-help.

The historian of education, therefore, pauses long over the founding of schools by Charlemagne; over the founding of the universities in the middle ages; and over the renewal of schools in the time of the Protestant Reformation. It was seen by all the leaders in the Protestant movement that school education was essential to its success, for it made an appeal to private judgment against the uniform tradition followed as a matter of custom and habit. It appealed to the Bible, and to its words as interpreted by the individual conscience, instead of the consensus of the Church. The right of private judgment in the interpretation of the Bible went for nothing unless accompanied with the ability to read. The Bible was translated first, and then Protestant youth had to learn to read it.

Martin Luther, in his "Address to the Burgomasters and Magistrates of all the Cities of Germany," in 1524, stated the fundamental conviction of the Protestant leaders in regard to schools. He recommended compulsory education both in this address and in a letter to Elector John of Saxony; he recommended schools for girls, and their instruction in Latin, in an address to the German nobility in 1520. He insisted on the grading of schools, and on proper methods of teaching to arouse the interest and self-activity of children, and the study of things as well as of words.

In the address of 1524 he enjoins on the burgomasters the public support of schools. "If we must annually expend large sums on muskets, roads, bridges, dams, and the like, in order that the city may have temporal peace and comfort, why should we not apply as much to our poor, neglected youth, in order that we may have a skillful schoolmaster?"

He defends the study of the languages, and makes the strongest of secular pleas for education after having set forth the religious reasons for it.

"Though there were no soul, nor heaven, nor hell, but only the civil government, would not *this* require good schools and learned men even more than our spiritual interests do? . . . This consideration is of itself sufficient for the establishment of the best schools everywhere, both for boys and for girls, namely, that society, for the maintenance of civil order and the proper regulation of the household, needs accomplished and well-trained men and women." He showed that education could not be left to the fam-

ily, so far as instruction in language, mathematics, arts, and history are concerned; these require schools.

"The schoolmaster," said he,* "is as important to a city as a pastor is. . . . Where schools prosper, the Church remains righteous and her doctrines pure."

With such views as these current we can not be surprised that the Protestant immigrants to America in the colonial period laid stress on the establishment of schools. The ideas of Luther were echoed by reformers in Holland, Sweden, Switzerland, and elsewhere. Education is called "the foundation of the commonwealth," in 1583, in a school law of Holland. In Sweden, education was common before 1650, and "every peasant's child was taught to read."

Boston, in 1635, voted a school, and funds to support a master. Roxbury was quite active in the founding of free schools. Plymouth, Weymouth, Dorchester, Salem, Cambridge, and other towns had schools before 1650.

A law of the General Court of Massachusetts decreed that in every town the selectmen should prosecute those who neglected "to train their children in learning and labor," and to impose a fine of twenty shillings on those who neglected to teach their children "so much learning as may enable them perfectly to read the English tongue."

Schools were established in the Connecticut colonies immediately after their settlement. The Rhode Island colonies had schools by 1650. In 1636 occurred the important vote of the General Court of Massachusetts setting apart four hundred pounds for the establishment of a college, which was endowed two years afterward by John Harvard, receiving seventeen hundred pounds and its name from the benefactor. The Public Latin School of Boston dates from 1635. Meanwhile, in New York, the Dutch had brought with them a zeal for education. The Dutch West India Company, in 1621, charged its colonists to maintain a clergyman and a schoolmaster. It seems that, in 1625, the Dutch colonial estimates for "New Amsterdam" included a clergyman at 1,440 florins and a schoolmaster at 360 florins. In 1633 the first schoolmaster, Adam Roelandsen (his name is gladly preserved, like that of Ezekiel Cheever and Philemon Purmont, schoolmasters of early Boston), came over with Wouter Van Twiller.

The historian Motley endeavors to trace to the influence of the

* See Luther on Education, by F. V. N. Painter.

Dutch the educational impulse among the New England settlers. It is not necessary, however, to seek any other origin than the influence of Calvin and Luther, which had spread through northern Europe by many a rivulet.

In 1688 William and Mary College was founded in Virginia, and handsomely endowed. Yale College was founded in 1701. To explain the lack of early public schools in Virginia, the opinion of the royal Governor Berkeley is often quoted: "I thank God there be no free schools nor printing presses, and I hope we shall not have them these hundred years; for learning has brought disobedience and heresy and sects into the world, and printing has divulged them and libels against the best of governments! God keep us from both!" The Governor of the Connecticut colony answered to the same question (put by the royal Commissioners of Foreign Plantations), "One fourth of the annual revenue of this colony is laid out in maintaining free schools for the education of the children."

Apropos to this utterance of Berkeley, against whom the more progressive spirit of Virginia arose in rebellion in 1676, there should be quoted a more noteworthy sentence from the Virginian, Thomas Jefferson, who wrote (to J. C. Cabell) in 1818, "A system of general instruction which shall reach every description of our citizens, from the richest to the poorest, as it was my earliest so will it be the latest of all the public concerns in which I shall permit myself to take an interest."

In 1647 the Massachusetts General Court passed what has become the most celebrated of the early school laws of the colonies. In it occurs the often-quoted passage: "To the end that learning may not be buried in the graves of our forefathers, . . . it is ordered . . . that every township within this jurisdiction, . . . of the number of fifty householders, shall appoint one within their own town to teach all such children as shall resort to him to write and read, whose wages shall be paid either by the parents or masters of such children, or by the inhabitants in general. . . . It is further ordered that any town . . . of one hundred . . . householders . . . shall set up a grammar * school, the master thereof being able to instruct youths so far as they may be fitted for the university." This law attached a penalty to its violation.

New Jersey established schools as early as 1683, and an exam-

* "Grammar" meant Latin grammar at that period.

ple of a permanent school fund is found in an appropriation made that year. In 1693 a law compelled citizens to pay their shares for the maintenance of a school. In 1726 a clergyman from Pennsylvania established in New Jersey a classical school that grew in after years (1746) into Princeton College.

The original charter given William Penn required that the government of his colony should "erect and order all public schools." Within twenty years after its settlement schools were founded in Philadelphia and other towns of that colony.

Certain private endowed schools had great repute—such, for example, as the Phillips Academies at Andover, Mass., and Exeter, N. H., founded respectively in 1778 and 1783. Columbia College (1754) was founded, like William and Mary, by royal charter. The University of Pennsylvania grew out of the Philadelphia Academy, opened in 1749, and Dr. Franklin was an active mover in behalf of it. Brown University (1764) was founded by the Baptists of Rhode Island. Dartmouth College, in New Hampshire, was chartered in 1769; and sixteen other colleges were established before 1800, including Rutgers, Williams, Bowdoin, two new ones in Virginia, and three in Maryland. The University of Virginia, a favorite scheme of Jefferson, did not get incorporated until 1819, and was opened in 1825, but it furnished a new type of university as a model for others established in the South, and toward which the universities of the North seem to be slowly advancing. State universities have been established in upward of thirty States. These are endowed by land grants and annual stipends appropriated by the State Legislatures.

By the year 1800 there were twenty-four colleges in all, eight of them in New England, six in the Middle States (New York, New Jersey, and Pennsylvania), nine in the Southern States, and one in the District of Columbia.

The management of district (elementary) schools began in most cases with the church, and gradually came into the hands of the smallest political subdivision, known as "districts." Each township was divided into districts for school purposes, and for minor political purposes, such as repair of public highways. Each district contained an average of four square miles, with a schoolhouse near the center of population, usually at a little distance from some village, and holding a maximum of forty or fifty pupils. The school committee employed teachers. The schools held a three months' session in the winter, and sometimes this was made four months. The winter school was nearly always "kept" by a

man. There might be a summer school, with a brief session, kept by a woman. Wages for the winter school, even as late as 1840, in the rural districts of New England, were six to ten dollars a month.

The schoolmaster might be a young college student trying to earn money enough during his vacation to continue his course in college. More commonly he was a surveyor, or a clerk, or a farmer, who had a slender store of learning, but who could "keep order." He possessed the faculty to keep down the boisterous or rebellious pupils, and could hear them recite their lessons, memorized from the book. There were no classes, as a rule, except with beginners, and except in some branches, such as Noah Webster's Spelling Book, which was learned from cover to cover. It served as the primer in which children learned their letters and first reading lessons. All of the older pupils read in an advanced reader—Lindley Murray's English Reader or some American Preceptor, with selections of literature, chosen rather for their sound sense and moral reflections than as, in the present day, for their power to excite an interest on the part of the pupil. The writing was also conducted as one class, but the master "set the copies" for each pupil according to his progress, and, passing from one to another, made criticisms or explanations. He also mended the goose-quill pens when they spluttered or became too coarse for the hair lines. The other recitations of the advanced pupils were heard by the master one by one; in fact, the method of instruction was "individual" for the most part. The recitations were consequently very short—not long enough to go into the merits of the topic and discuss the real thoughts involved. The pupil consequently was not taught how to probe the meaning of the words of the printed page. He memorized or "crammed" his lesson, and digested it to some extent in after years. The teacher rarely attempted to explain the words.

The text-books were not written with reference to the child's power of comprehension. Noah Webster's Spelling Book, for example, was written for a highly educated person. It gave, in the fore part, a series of definitions carefully modeled on Aristotle's logical rules for a definition—containing the "proximate genus and the specific difference." Here is a specimen definition which all the pupils, young and old, committed to memory winter after winter, and recited again and again, without much insight into its meaning either on the part of the pupil or the teacher: "Language or speech is the utterance of articulate sounds ren-

dered significant by usage for the expression or communication of thoughts." Few pupils who memorized it, few teachers who heard it repeated, ever knew that this was an attempt on the part of the distinguished lexicographer to define the mother tongue used by them daily and hourly.*

Here is a definition from a geography which professed to be on an "improved plan": "A city is a large town containing many houses, incorporated with peculiar privileges, and governed by a mayor, alderman, and other officers."

All pupils able to read formed one large class for the reading of the New Testament at the opening of the school in the morning or at its close in the afternoon. It was usually read through from the beginning, each pupil reading his verse as his turn came.

Before the advent of Webster's speller, and for some time after, the catechism was taught as an elementary primer or first reading book. A copy of an edition of this, printed in Boston as early as 1691, has been found.

Henry Barnard has reprinted this remarkable text-book in his American Journal of Education for July, 1880, preceding it by an account of Froebel's educational views, which are sufficiently in contrast as regards pedagogical methods.

When villages began to grow large the school increased in size, and perhaps two schools were held in two rooms of the same building, at first no thought having occurred of the possibility of classifying or grading the pupils into a lower and upper school. Grading began soon, however, and great progress was made in such cities as Boston, Providence, New York, and Philadelphia toward perfecting the school.

There were in some places school societies, semi-public corporations, that founded and managed the schools, receiving more or less aid from the public funds. Such associations provided much of the education in New York, Philadelphia, and in parts of New England before the advent of the public schools.

The obvious defect of the district school was the impossibility of grading or classifying it. Each pupil had to form a class by himself, and he generally used such a text-book as he happened to have, there being no uniformity of text-books except in the matter of readers and spellers, so that classification was not prac-

* It is of interest to know that this Webster's Spelling Book is still used in the rural districts of many States North and South, and that larger editions of it are sold than of any other text-book. In 1880 the sale amounted to one and a quarter million copies per annum.

ticable even where two pupils were of the same grade of advancement. Twenty to thirty recitations were heard in a single half-day session of school, averaging perhaps between five and ten minutes each. The lowest pupils in school were four years old, beginning the alphabet; the highest pupils were perhaps twenty years old, and doing work eight or ten years in advance of the lowest class; for in these ungraded schools it often happened that the oldest pupils took up secondary branches, many studying algebra, and some of them Latin, in districts where the teacher was a college student.

After the railroad had connected the villages with large cities, bringing them into contact with urban life, graded schools began to replace the ungraded schools, and to hold an annual session of ten or eleven months. This required the services of a person whose entire vocation was teaching. One of the chief defects of the rural district school was to be found in the fact that the man who taught the winter school took up teaching as a mere makeshift, depending on his other business or trade (surveyor, or clerk, or farmer, etc.) for his chief support. There was small chance for the acquirement of any knowledge of the true methods of teaching. Another evil more prominent than the former was the letting down of standards, caused by the low qualifications of the average committeeman. The town as a whole could afford a school committee of high qualifications; the average district rarely. The township system therefore attains a far higher standard of efficiency than the district system.

When the villages began to catch the urban spirit and establish graded schools with a full annual session, there came a demand for a higher order of teacher—the professional teacher, in short. This caused a comparison of ideals, and the most enlightened in the community began an agitation of the school question, and supervision was demanded. In Massachusetts, where the urban civilization had made most progress, this agitation resulted in the formation of a State Board of Education in 1837, and the employment of Horace Mann as its secretary (June of that year). Boston had been connected with Providence and Worcester and Lowell by railroads before 1835, and in 1842 the first great trunk railroad had been completed through Springfield to Albany, opening to Boston a communication with the West by the Erie Canal and the newly completed railroad from Albany to Buffalo. This was the beginning of the great urban epoch in America that has gone on increasing in intensity to this day.

Chapel and dormitories, Amherst College.

The number of cities containing 8,000 inhabitants and upward was in 1790 only 6; between 1800 and 1810 it increased to 11; in 1820, 13; 1830, 26; 1840, 44. In the fifty years between 1840 and 1890 it has increased from 44 to 443, or ten times the former number. The urban population of this country in 1790 was, according to the Superintendent of the Census (see Bulletin No. 52, April 17, 1891), only one in thirty of the population; in 1840 it had increased to one in twelve; in 1890 to one in three. In fact, if we count the towns on the railroads that are made urban by their close connection with large cities and the suburban districts, it is safe to say that now one half of the population is urban.

Horace Mann came to the head of education in Massachusetts just at the beginning of this epoch of railroads and the growth of cities. He attacked with unsparing severity the evils of the schools as he found them. The school-district system, introduced into Connecticut in 1701, into Rhode Island about 1750, and into Massachusetts in 1789,* was pronounced by Horace Mann to be the most disastrous feature in the whole history of educational legislation in Massachusetts. Side by side with the new impulse given to education in the villages, no doubt the district system seemed very bad. Its evils were manifest in the opposition to central graded schools which were needed in the populous villages, but which would break up the old district lines. Local power is never given up to a central power without a struggle. The stubbornness of this contest on the part of local committeemen was continued long after the adoption of the township system in Massachusetts and elsewhere. The district fought for its "rights" through its representatives on the town board, thereby postponing the feasible consolidation of districts and the formation of properly classified schools.

Let us dwell a moment on this advantage of consolidated or "union" schools, as called in New York and the West. In the rural school, isolated as it was, all grades of pupils, from the lowest primary up to the secondary, came together under one master, who had to give individual instruction to each, finding only five minutes or a little more for each lesson. Under such circumstances he could not well manage over twenty or thirty pupils. In his classes, each formed of one pupil in those branches other than reading and spelling, he might have done better teaching had he had two pupils instead of one; for the child learns almost as much

* See Boone, History of Education in the United States, p. 96.

from paying attention to the efforts of his classmate to recite as from his own efforts. A skillful teacher can make a recitation by an entire class of twenty or thirty pupils of even grade of advancement far more instructive to each pupil than a private tutor can make the same lesson to his one pupil. The other pupils of the class furnish a sort of bridge between the teacher's mind (that sees or should see the topic under discussion in its relation to all human learning) and the individual pupil's mind (that sees the topic in its barest outlines and has scarcely learned its relations to other topics). For each pupil gets some one-sided view of it for himself, and sees in the class exercise (called "recitation" in our American school technique) many other one-sided views presented by his fellow-pupils, who are not likely to repeat his one-sided view, but to have others equally distorted of their own.

Suppose two ungraded schools to be united in one and divided again according to grade; the thirty pupils youngest, and in lowest elementary studies, taken by one teacher, and the other thirty pupils taken by the other teacher. One half of the number of classes is saved by consolidation, and each teacher has twice as much time for each class exercise or recitation. He can find more time to go into the merits of the subject when he has ten minutes instead of five minutes.

In a populous village a school of five hundred pupils is collected. There is a teacher for each fifty pupils, making ten in all; for nearly twice as many pupils can be taught by each teacher in a well-graded school as in an ungraded school. Each of these ten teachers divides his fifty pupils into two classes according to advancement, and the classes average half a year's difference in their intervals of progress from the classes above or below. He has thirty minutes for each recitation. It is now possible to promote a bright pupil, who is not finding enough to do in the tasks set for his class, to the next class above; for he can soon make up what he has omitted by the leap from one class to another. So, too, a pupil who is falling behind his class can take up his work with the next class below and find it better suited to his powers.

It was an insight into this principle that led Martin Luther, as we have seen, to insist on grading the schools. The Jesuits, who were the first to seize on the chief weapon of the Protestants and turn it against them in the interest of the Catholic Church, also formed a school system in 1590, and took much pains with grading and classification.

Horace Mann's efforts did not abolish the district system in Massachusetts, but it prevailed to consolidate districts in populous sections of the State. His school reports were widely read outside of the State, and spread the agitation of the school question into Rhode Island, Connecticut, New York, and elsewhere. Connecticut succeeded in abolishing her district system in 1856, but Massachusetts clung to it until 1869, when she got rid of it. In this action she was followed by Maine in 1872. The State Superintendent of Maine ably sums up the evils of the district system thus:

"First, the school moneys were inequably divided, some districts receiving much more than they could profitably expend, others much less than was absolutely needed. Second, poor schoolhouses in remote and sparsely settled districts. Third, short schools, or poor ones, if the agent attempted to lengthen them by hiring cheap teachers. Little money, poor schoolhouses, short schools, are the necessary attendants of this system."

Horace Mann extended his criticisms and suggestions to the examination of teachers and their instruction in institutes; to the improvement of school buildings; the raising of school funds by taxation; the creating of a correct public opinion on school questions; the care for vicious youth in appropriate schools. He discarded the hide-bound text-book method of teaching, and substituted the oral discussion of the topic in place of the memorizing of the words of the book. He encouraged school libraries and school apparatus.

Horace Mann's influence founded the first normal school in the United States, at Lexington (afterward removed to Framingham), and a second one founded at Bridgewater in the fall of the same year (1839).

Inspired by the example in Massachusetts, Connecticut was aroused by Henry Barnard, who carried through the Legislature the act organizing a State Board of Commissioners, and became himself the first secretary of it (1839). In 1849 Connecticut established a normal school. In 1843 Mr. Barnard went to Rhode Island and assisted in drawing up the State school law, under which he became the first commissioner, and labored there for six years.

These were the chief fermenting influences in education that worked a wide change in the management of schools in the Middle and Western States within the past fifty years.

Superintendents of city school systems began in 1837 with

Buffalo. Providence followed in 1839; New Orleans in 1841; Cleveland in 1844; Baltimore in 1849; Cincinnati in 1850; Boston in 1851; New York, San Francisco, and Jersey City in 1852; Newark and Brooklyn in 1853; Chicago and St. Louis in 1854. Finally, Philadelphia in 1883.

State Superintendents began with New York in 1813; she was followed by sixteen other States before 1850. From 1851 to the civil war eight States established the office of State Superintendent; since then nineteen other States, including ten in the South.

Normal schools in the United States increased from one, beginning in 1839 in Massachusetts, to 138 public and 46 private normal schools in 1889, with an attendance of upward of 28,000 students preparing for the work of teaching. This would give some 12,000 graduates a year for new teachers to supply the demand. It may be assumed from this that less than one sixth of the supply of new teachers comes from the training schools specially designed to educate teachers.

In closing this historical survey I append some comparative tables taken from the Reports of the Bureau of Education for 1890, showing progress for twenty-one years in the public schools.

A Twenty Years' Retrospect—1870 to 1890.

The following tables and diagrams exhibit the progress of the common schools of the United States since 1870:

Year.	Population.	Total number of pupils.	Average daily attendance.	Number of schoolhouses.	Value of school property.
1870	38,558,371	6,871,522	4,077,347	116,312	$130,383,008
1871	39,500,500	7,561,582	4,545,317	132,119	143,818,703
1872	40,477,000	7,815,306	4,658,844	140,167	159,406,374
1873	41,490,442	8,003,614	4,745,459	145,863	173,077,552
1874	42,570,731	8,444,251	5,050,840	150,534	183,101,193
1875	43,700,554	8,785,678	5,248,114	157,364	192,013,666
1876	44,881,700	8,869,115	5,291,376	159,533	201,592,171
1877	46,112,700	8,965,006	5,426,595	163,694	198,554,584
1878	47,397,151	9,438,883	5,783,065	169,493	203,258,664
1879	48,744,700	9,504,458	5,876,077	171,613	205,913,196
1880	50,155,783	9,867,505	6,144,143	178,222	209,571,718
1881	51,274,900	10,000,896	6,145,932	183,452	217,505,356
1882	52,441,700	10,211,578	6,331,242	185,884	223,424,448
1883	53,654,100	10,651,828	6,652,392	193,147	237,140,889
1884	54,910,358	10,982,364	7,055,696	199,479	245,457,741
1885	56,221,868	11,398,024	7,297,529	205,315	263,668,536
1886	57,447,100	11,664,460	7,526,351	208,777	275,809,020
1887	58,712,678	11,884,944	7,681,806	213,737	290,384,522
1888	59,935,709	12,182,600	7,906,986	216,399	301,425,928
1889	61,148,714	12,392,260	8,005,969	221,284	321,561,176
1890	62,622,250	12,697,196	8,144,938	224,839	342,876,494

The rapid advance in the value of school property is to be noticed. This has averaged an increase of $10,000,000 a year for twenty-one years.

In the following table the relative number of men and women teachers may be seen, and the amount of salaries in the aggregate, together with the total expenditure, in the public schools of the country:

Years.	Number of teachers.			Paid for salaries of superintendents and teachers.	Total expenditure.
	Male.	Female.	Total.		
1870	77,529	122,586	200,515	$37,832,566	$63,396,666
1871	90,293	129,932	220,225	42,580,853	69,107,612
1872	94,992	134,929	229,921	46,035,681	74,234,476
1873	97,790	139,723	237,513	47,932,050	76,238,464
1874	103,465	144,982	248,447	50,785,656	80,054,286
1875	108,791	149,074	257,865	54,722,250	83,504,007
1876	109,780	149,838	259,618	55,358,166	83,082,578
1877	114,312	152,738	267,050	54,973,776	79,439,826
1878	119,404	157,743	277,147	56,155,133	79,083,260
1879	121,490	158,840	280,330	54,639,731	76,192,375
1880	122,795	163,798	286,593	55,942,972	78,094,687
1881	122,511	171,349	293,860	58,012,463	83,642,964
1882	118,892	180,187	299,079	60,594,933	88,990,466
1883	116,388	188,001	304,389	64,798,859	96,750,003
1884	118,905	195,110	314,015	68,384,275	103,212,837
1885	121,762	204,156	325,916	72,878,993	110,328,375
1886	123,792	207,601	331,393	76,270,434	113,322,545
1887	127,093	212,367	339,460	78,639,964	115,783,890
1888	126,240	220,894	347,134	83,022,562	124,244,911
1889	124,467	232,110	356,577	87,568,306	132,539,783
1890	125,602	238,333	363,935	91,683,338	140,277,484

Expenditures have averaged an increase of nearly $4,000,000 a year, and the expense for salaries of teachers and superintendents has increased $2,750,000 a year for the twenty-one years.

This phenomenal increase in expenditures is partly explained by the increase in the number of pupils to be provided for. The proportion of the population in school has increased materially during the past twenty years, as shown in one of the tables of this exhibit. Besides this, there is a considerable increase in the length of the annual school session. In cities and villages the teachers are employed for eight or ten months, and paid a whole year's salary. Formerly the proportion of rural schools holding only a three or four months' session in the year was much greater. Professional teachers demand and receive higher wages, and are to be found only in those districts that support a school for eight or ten months. As the village grows into a city its school system gets more complex, and a superintendent is appointed to take charge of it.

In the following table one may see the progress of the Southern States in making provision for education for the past twenty years:

The Total School Expenditure compared with the Total Population and with the Average Attendance.

Year.	Expended for common schools per capita of the population.						Expended for common schools per pupil.					
	The United States.	North Atlantic Division.	South Atlantic Division.	South Central Division.	North Central Division.	Western Division.	The United States.	North Atlantic Division.	South Atlantic Division.	South Central Division.	North Central Division.	Western Division.
1870..	$1.64	$2.31	$0.47	$0.48	$2.09	$2.02	$15.55	$17.82	$12.68	$9.44	$14.68	$22.25
1871..	1.75	2.38	.63	.73	2.14	2.15	15.20	18.31	10.27	9.06	14.87	21.86
1872..	1.83	2.40	.68	.81	2.31	2.27	15.93	18.87	10.47	9.08	16.37	23.57
1873..	1.84	2.44	.68	.74	2.31	2.42	16.07	19.90	9.25	8.39	16.53	25.04
1874..	1.88	2.51	.76	.68	2.38	2.40	15.85	19.90	9.00	7.55	16.57	24.37
1875..	1.91	2.55	.80	.73	2.36	2.76	15.91	20.17	8.98	7.51	16.69	26.85
1876.	1.85	2.45	.79	.55	2.37	2.78	15.70	19.15	8.65	6.70	16.91	26.35
1877..	1.72	2.29	.72	.51	2.21	2.61	14.64	17.89	7.68	6.25	15.93	24.69
1878..	1.67	2.15	.70	.56	2.14	2.73	13.68	16.55	7.21	5.98	15.08	25.82
1879..	1.56	2.03	.63	.55	2.00	2.53	12.97	16.05	6.76	5.65	14.23	23.39
1880..	1.56	1.97	.68	.55	2.03	2.41	12.71	15.64	6.60	5.40	14.40	22.59
1881..	1.63	2.08	.72	.58	2.09	2.54	13.61	17.14	7.22	5.71	15.19	23.81
1882..	1.70	2.11	.78	.64	2.19	2.59	14.05	17.35	7.63	6.25	15.80	24.32
1883..	1.80	2.22	.82	.68	2.34	2.74	14.54	18.17	7.46	6.17	16.69	25.39
1884..	1.88	2.25	.84	.74	2.48	2.83	14.63	18.37	7.44	6.26	16.90	24.68
1885..	1.96	2.38	.88	.82	2.53	2.90	15.12	19.19	7.32	6.74	17.54	26.31
1886..	1.97	2.36	.88	.87	2.54	2.88	15.06	19.11	7.33	6.93	17.45	25.52
1887..	1.97	2.35	.90	.87	2.55	2.76	15.07	19.38	7.33	6.88	17.45	24.85
1888..	2.07	2.48	.95	.87	2.68	2.96	15.58	20.60	7.61	6.60	18.29	27.38
1889..	2.17	2.59	.98	.94	2.76	3.28	16.51	21.64	7.77	7.12	19.30	29.37
1890..	2.24	2.76	.96	.98	2.81	3.35	17.22	23.58	7.63	7.34	19.70	30.45

It will be seen that the amount per inhabitant in the South has doubled. But the number of pupils enrolled in school has so much increased that the amount *pro rata* has decreased in some cases.

In comparing the efforts made in the different sections of the country, it is important to bear in mind the amount of taxable property. It will be seen by the following table that, although the amount expended per inhabitant in the South is small, yet the rate of taxation for schools is large:

Total Expenditure per Inhabitant for Common Schools.

Year.	The United States.	North Atlantic Division.	South Atlantic Division.	South Central Division.	North Central Division.	Western Division.
1870.....	$4.47	$4.29	$1.68	$2.06	$6.77	$4.91
1880.....	4.62	3.78	3.08	3.58	6.45	5.03
1889.....	5.57	4.39	4.31	4.42	7.91	5.17

The following table shows the comparison by States as to the amount expended in teachers' salaries (including superintendence), and also for all purposes:

Average Cost of Education per Day for Each Pupil.

State or Territory.	Average daily expenditure for each pupil.	
	For salaries only.	For all purposes.
	Cents.	*Cents.*
The United States	8.4	12.9
North Atlantic Division	8.5	14.1
South Atlantic Division	6.1	7.8
South Central Division	6.8	8.3
North Central Division	8.7	13.3
Western Division	14.4	22.5
North Atlantic Division:		
Maine	7.4	12.1
New Hampshire	10.5	17.3
Vermont	8.6	11.4
Massachusetts	11.0	17.1
Rhode Island	8.9	13.9
Connecticut	8.9	14.1
New York	8.7	14.5
New Jersey	8.5	12.6
Pennsylvania	6.9	12.8
South Atlantic Division:		
Delaware	9.9	7.2
Maryland	7.9	10.1
District of Columbia	10.2	18.1
Virginia	5.6	6.9
West Virginia	7.2	10.2
North Carolina	4.8	5.9
South Carolina	4.3	4.9
Georgia	5.4	5.9
Florida	4.8	6.6
South Central Division:		
Kentucky	8.8	10.4
Tennessee	4.4	5.5
Alabama	4.9	6.6
South Central Division:		
Mississippi	5.8	6.6
Louisiana	5.7	8.5
Texas	9.0	10.9
Arkansas	7.8	9.1
North Central Division:		
Ohio	7.6	11.6
Indiana	9.2	11.8
Illinois	8.8	13.9
Michigan	7.6	12.2
Wisconsin	8.1	12.0
Minnesota	15.6	25.8
Iowa	9.0	13.4
Missouri	7.0	10.9
North Dakota	16.3	26.8
South Dakota	11.5	17.1
Nebraska	10.4	16.5
Kansas	9.2	15.1
Western Division:		
Montana	15.0	24.0
Wyoming	19.5	27.4
Colorado	14.6	30.1
New Mexico	8.7	11.5
Arizona	21.5	30.7
Utah	7.0	14.2
Nevada	19.2	22.8
Idaho	18.3	25.5
Washington	12.3	26.7
Oregon	11.3	15.7
California	15.9	22.4
Alaska	....	....

It will be noticed in the above table that the expenditures for teachers' salaries only forms a smaller proportion of the whole expenditure for education in the divisions of the United States where cities are most numerous and wealth has most accumulated. The wealthier the community the greater the expenditure for school buildings, improved furniture, apparatus, janitor hire, fuel, reference-books and text-books for indigent pupils.

The following table shows the comparative enrollment of colored and white in the South (including Missouri) for fourteen years, and the number of colored youth in normal and other advanced education. The falling off in the secondary in 1890 is

apparent only; it is due to the adoption of a more rigid standard of classification on the part of the bureau:

Sixteen Former Slave States and the District of Columbia.

Year.	Common-school enrollment.		Colored.			Expenditures.
	White.	Colored.	Normal schools.	Other secondary and higher.	Total colored.	Both races.
1876–'77	1,827,139	571,506	3,785	4,726	580,017	$11,231,073
1877–'78	2,034,946	675,150	5,236	7,795	688,181	11,760,251
1878–'79	2,013,684	685,942	6,171	8,253	700,366	12,181,602
1879–'80	2,215,674	784,709	7,408	7,996	800,113	12,475,044
1880–'81	2,234,877	802,374	7,621	8,372	802,372	13,359,784
1881–'82	2,249,263	802,982	8,509	9,889	821,380	14,820,972
1882–'83	2,370,110	817,210	8,509	9,889	835,638	14,324,925
1883–'84	2,546,448	1,002,313	10,771	13,035	1,026,119	17,053,467
1884–'85	2,676,911	1,030,463	8,390	15,110	1,053,963	17,227,373
1885–'86	2,773,145	1,048,659	6,207	16,831	1,071,697	18,439,891
1886–'87	2,975,773	1,118,556	1,771	11,577	1,131,904	20,821,999
1887–'88	3,110,606	1,140,405	5,439	12,254	1,158,098	21,810,158
1888–'89	3,197,830	1,213,092	7,462	18,068	1,238,622	23,226,982
1889–'90	3,402,420	1,296,959	6,201	14,980	1,318,140	24,880,107

Total amount expended in fourteen years, $241,524,806.

What is taught in the Schools.

The course of study, as above mentioned, is divided into three periods: that of elementary education, occupying an average of eight years of the life of the child, say from six to fourteen; secondary education, four years, from fourteen to eighteen; and higher education, four years, from eighteen to twenty-two. Each period has studies proper for it.

I have already discussed some phases of the studies of the school in showing the use of the school to society and the nation. The general characteristic of all school studies is technical, as I have explained in the first chapter. It gives the pupil a command of the tools of thought. With school training the child becomes able to make progress in the mastery of the world's knowledge.

The studies of the first eight years of school—reading, writing, and arithmetic—are the chief branches. First, there is counting. An ingenious device used in some schools is to have the pupil learn the numbers on the pages of his primer as he proceeds. In a few days he has the numbers up to ten, and begins numbers of two places of digits. Another device, imported from Germany and used here in many schools, is that called the "Grube method." It teaches the four fundamental rules or operations from the beginning, commencing with one. It adds and subtracts, multiplies

University Hall, University of Michigan, Ann Arbor.

and divides, analyzing thoroughly. Thus, taking the number four as an example, its operations are expressed as "four equals three and one or two and two; one from four leave three; two from four leave two; three from four leave one; two times two are four; three times one are four less one; four contains two twice and one four times, and three once with one remainder.

If children on commencing school begin to calculate by the Grube method they acquire more self-help in arithmetic than if they take up the elementary operations in the old way, first learning numeration, then addition, and by and by coming to multiplication and division.*

There have been in use many methods of learning to read. The old method of the ungraded school was the alphabetic, in which the child at first learned to recognize the letters one after the other—A, B, C, etc.—without putting them to any use whatever. Then he was set to work learning to spell the absurd words or syllables a-b, ab, e-b eb, i-b, ib, etc., still without any interest to him. Finally, he began with an artificial literature, very vague in its suggestions: "Do we go?" "He is up." "I am in," etc.

The revival of the public interest in education that was stimulated by Horace Mann gave rise to the so-called "word method" of teaching reading. Mrs. Horace Mann and her sister, Miss Elizabeth Peabody, used this method in 1847, probably inventing it without any hints from those who had used it before. The word method begins with a sentence interesting to the child and relates something perfectly familiar to him. It does not limit itself to words of two or three letters, but strikes out boldly with such a sentence as "The bird sings in the tree." The child learns to recognize the words by their general shape at first, and not by the letters composing them. Analysis of the words follows, and thus he comes to know the letters after a few days when he has already learned many words by their general appearance.

Great care is taken to give the child only such words as he is already familiar with colloquially. If he is to learn a new vocabulary at the same time he learns a new form of expressing words, he has two difficulties where he should have but one. One difficulty is enough at a time. He should take the words already familiar to his ear and learn the printed and written forms for them, so that they may become familiar to the eye. The first three

* The Grube method was first presented in English by Dr. Louis F. Soldan, at present Principal of the St. Louis High School.

readers of the ordinary series (which consists of five or six books) should therefore have only colloquial words. This will keep the child busy for two years in learning a vocabulary of printed words by sight, the oral forms being already familiar to his ear. In the third year—say at eight years—he should begin to take up the literary vocabulary, which always has its unfamiliar words to the person who knows only the colloquial vocabulary.

This is the course of learning to read pursued in the great majority of schools in the United States. The pupil reads three or four Readers (a First, Second, and Third) that have few words not familiar by sound to the pupil. This course is perhaps to be condemned for staying too long in the colloquial vocabulary; but the primary teacher gets more lively reading from her pupils so long as they attempt only such words as they know by sound. Still there should be no delay after the child has had two whole years in simple familiar language to commence the Readers that have selections from the great writers. The pieces of fine writing, intense feeling, happy expression, the gems of literature, in short, are picked out by the compilers of text-books in reading, and the child goes over them so often that the greater part of the best clings to his memory and he enlarges his vocabulary by a list of words that express subtle distinctions in thought, refinements of feeling, and aspiration. Literature reveals to him human nature. Thoughts and feelings which have come to the child occasionally in moments of elevation, but too great or too subtle for expression, get in the literary gems their happiest utterance, and the child comes to possess them forever.

The selections from prose and poetry in the higher Readers are for the most part a series of pieces that have passed through the fire of repeated selection and scores of years of use in the schoolroom. All higher readers must have such pieces as Byron's Waterloo, Campbell's Hohenlinden, Webster's Reply to Hayne, Jane Taylor's Discontented Pendulum, Tennyson's Charge of the Light Brigade, Burns's Bruce's Address, Wolfe's Burial of Sir John Moore, and a hundred others that are favorites of all English-speaking peoples.

There have been many attempts to turn the school pupils off from this staple literature, some proposing information Readers giving scraps of science or history; others proposing a more *recherché* class of literature, and for this reason secondary in value to those favorites of the people.

What the Readers require is selections that contain the expres-

sion that literary genius has found for the situations and rare moments of life that give one glimpses of the highest phases of human nature. These are pretty generally found in use throughout the country. But the criticism is valid against city schools that they hold back pupils too long from classic pieces; while perhaps the rural schools err in the opposite direction, and take up the pieces of great authors before their pupils have become familiar with the printed forms of the words in their colloquial vocabulary.

I have omitted to mention a method of teaching reading called the "phonic." It takes up a single vowel sound, usually that of short *a* heard in *cat*, *cap*, *rat*, etc., and after the child has learned some words in this sound other words with other sounds are introduced. The process has the effect of teaching the child to read by a phonetic alphabet. But it has the danger of teaching the child a stilted and unnatural English, inasmuch as it is limited in its vocabulary to such words as illustrate the use of one particular sound. "A fat rat had a cap and sat on a mat" presents irrational or grotesque ideas to the child, and impresses on his mind an unhappy style of English. First impressions are very deep and abiding. The ingenuity of the phonic teachers is taxed to the utmost to arrange sentences that use only the sounds required. The conditions of the problem are too limited, and even if the sentences are made reasonable in other respects they remain unfortunate in style because they load down a prose sentence with a series of assonances or rhymes.

The best form of the phonic method of teaching reading is that of the modified type, which gives to each power of a letter some modification of its form to distinguish it, and yet preserves on the whole its general appearance. The diacritical marks of the dictionaries have been used for this purpose, but not with so much success as that attained by an invention of Dr. Edwin Leigh, who represented the silent letters by hair-line outlines, and gave modifications to each of the letters so as to suggest the sound of the other letter which it was borrowing. For instance, *o* with the sound of short *u*, as in the word *come*, was represented by the *o* with a projection on the left, giving a portion of the letter *u*; the letter *d* pronounced *t*, as in *looked*, had its top crossed like a *t*, etc.

This phonic system of Dr. Leigh was put on trial in St. Louis with classes of pupils that had been taught German as the native language of their parents. The drill given them brought out

very good enunciation. But the surprising part of the experiment was the time saved in learning to read. The pupils thus taught learned their primer thoroughly in ten weeks, read through a Second Reader printed in the same modified type, and then passed over into the ordinary print by the end of ten weeks more. The children seemed to enjoy reading better than others had done with the other style of primer. Dr. Leigh had taken great pains to preserve the general appearance of the words, although making slight changes in the letters.

Hence, when the child learned to read fluently in the modified type, he could also read fluently in the unmodified or ordinary type, because we read not by noticing the letters, but by the general form of the word, when we read fluently. Only when we are first learning a word do we analyze it by its letters.

The experience of two decades in St. Louis gave us the general result that the children saved a year over the old method in learning to read. The old method in use in St. Louis before the Leigh method was the word method. According to that method, it was customary to spend a year on the primer then used (Sargent's).

The orthography of the English language is so irregular, so full of anomalies, that it requires special study; and a large proportion of the time in the district school must be consumed if any degree of accuracy is secured. The old-fashioned way of learning to spell made the spelling book a more formidable text-book than the Reader, and it stood next to the arithmetic in the amount of time devoted to it.

The Speller contained ten or twelve thousand words, arranged in lists with the same number of syllables or with similar endings, as *tion*, *sion*, *ness*, *ment*, etc. This arrangement paralyzed the memory of the pupil, because the first word in the column was a key to the rest that followed it, and no new exercise of the memory took effect in the lesson after learning the first word.

Noticing this fact when I was teaching a district school in St. Louis, I devised a Speller that gave only the exceptional words difficult to spell, collecting about twelve hundred in all, and arranging them so that one word in the lesson was not a key to the next. I brought together the different ways of representing an elementary sound so as to call into exercise the memory of forms in the most energetic manner. As, for instance, in the sound of long *e* I brought together, for example, *people* (*eo*), *Cæsar* (*æ*), *ravine* (*i*), *weird* (*ei*), *belief* (*ie*), omitting words with the most com-

mon combinations of *e*, *ee*, and *ea*. I could take a class through these twelve hundred words in a half-year's time by short daily lessons, and the majority of the class could spell every word. I did not care for any more special lessons in spelling, because I knew that by the time this list had been learned all the industrious pupils had trained their memory of the form of words in such a way that they would unconsciously notice and remember any peculiarities in new words. The result anticipated actually occurred. When I became superintendent of the city schools I used the same device, and a vast multitude of children of foreign parents, to whom spelling was the dunces' bridge, became good spellers within one year and remained such. I believe that a select list of five hundred words, thoroughly memorized and often reviewed, would prove far better than the ten thousand of the ordinary spelling book.

The new method of teaching professes to discard the spelling book altogether. But in the written language-lessons which are offered in the place of the spelling book and the grammar there is left very much work in the correction of spelling that could be most economically expended on a short selected list of words difficult to spell. The words spelled according to the ordinary analogies need never be placed in the book, for they will take possession of the child's mind without any effort as he looks at the printed page. It is the unusual combinations employed to represent elementary sounds that need to be learned by a special effort, and I found that a study of these improved the pupil's command of the ordinary words not difficult. The secret of the memory is this: its training affects directly the power of attention—it is at first conscious, but soon it becomes unconscious, or attention without special effort of the will. This unconscious attention does the work of picking up the unusual words, and of noting the conformity of ordinary words to a common standard. I mention this method here in detail in order to illustrate what is perhaps one of the greatest defects in the course of study in our district schools.

The specialist on city schools in the National Bureau of Education collected for the report of 1888–'89 (pp. 373–410), from a selected list of the 82 most important cities of the nation, statistics showing the amount of time consumed in the entire eight years of the elementary course on each of the branches constituting the curriculum. The returns included twenty-six branches, one of which was spelling. The total number of hours of instruc-

tion in the entire eight years varied in the different cities from 3,000 to 9,000, with a general average of about 7,000 hours, which would mean that each pupil used about four and a half hours per day for 200 days in actual study and in recitation or class exercises. The amount of time reported as used by pupils in studying and reciting spelling during the eight years varied from about 300 to 1,200 hours, with an average of 616. This means that from 37 to 150 hours a year, with an average of 77 hours a year for eight years, was devoted to spelling.

The pupils who learned to read by the Leigh phonic system were better spellers, on the whole, than those who learned by the other methods, because they were taught to notice the silent letters (indicated by hair-line outlines), and also to note peculiar forms for rare or unusual sounds given a letter. But all pupils learned to spell reasonably well by a thorough drill in the selected list of words here described.

The report of the Bureau of Education mentioned gives the time devoted to reading in 82 cities as ranging from about 600 to about 2,000 hours, and the average as 1,188 hours. This gives us from 75 to 250 hours a year, with an average of 150, spent in learning to read.

Geography is reported as using from 200 to 1,000 hours, with an average of about 500, or 25 to 125 hours per year, with an average of rather more than 60. This, we see, is less than the time devoted to spelling.

In learning geography the pupil acquires some idea of his relation to the rest of mankind, and of the relation of his own section to the other parts of the world. He learns something of the laws of supply and demand that unite different peoples and different countries. Even if geography be poorly taught, the pupil can not help learning that there is division of labor, and that some people produce one class of things for the market of the world while other people produce very different things. Exchange equalizes these needs and productions, and makes both richer because each spares something not needed by itself and gets in return something that it does need. This great lesson of interdependence, and the division of labor mediated by the market of the world is the fundamental lesson of political economy so well presented by Adam Smith. It is the most important lesson of geography to the child, although he does not see it in any philosophical form, but knows it only in details. He can not see the forest because the trees are in the way, but he sees the trees.

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1. Encina Hall. 2. Entrance to Quadrangle. 3. Roble Hall. 4. Art Museum.

In many schools, however, this lesson of commerce as the true center of geographical teaching is well understood. Commerce in its narrow sense is limited to exchange of goods; commerce in its deeper and wider sense includes the exchange of ideas, manners and customs, the acquirement of human culture.

Geographical revivals have been numerous in the history of American schools. There has been the map-drawing craze, which was not a craze so long as its maps were drawn by the aid of parallels and meridians, so that each map showed by its latitude and longitude its relation to all other parts of the world. But when maps were shaped by triangles and squares, and the lines of longitude and latitude disused, it became a "craze"; for it omitted the most essential knowledge of geography, which is not shape or contour, but relation to other lands.

There was the new movement in behalf of the study of physical geography, inaugurated in this country chiefly by Guyot, following the scientific direction marked out by Ritter and his compeers. It may be styled accurately the study of geography *as the process of formation of continents*. The pupil was given the principles from geology, astronomy, and meteorology, and taught how to explain the elevation of mountain chains, and their use as determining watersheds and the location of rivers and lakes.

This valuable direction of geography has never been adopted in its pure form very extensively in our schools, but it has influenced all the book-makers, and changed materially the old form of teaching geography. Inasmuch as it teaches geography from the standpoint of its interrelation with other natural sciences it requires greater maturity than is found in the elementary schools. The outlines of physical geography are given in many excellent text-books, and these are used to great advantage in the first year of the secondary course of study in high schools. The criticism justly incurred by this new departure where it was tried in the elementary schools is this: it neglected commerce as its true center and took the process of land formation instead. This caused it to slight the features of the world interesting to human nature and give more attention to mere mechanical processes. One can find as much of interest, as far as pure physical geography is concerned, in the uninhabited regions as in those that form the dwelling place of civilization.

The new departure in behalf of commerce as the center of geographical instruction was made some years earlier than that in behalf of physical geography. Warren's Common School

Geography (before 1850) was the pioneer, since followed by many excellent treatises. "Political geography" was the name properly enough applied to the older text-books on geography. Commercial, social, political, historical, would be a description of the new departure of Warren. But mathematical and physical features were also discussed in a summary manner.

If the pupil gets information regarding his own relations and the relations of his locality to the rest of the world even by the poorest teaching of geography, it is evident that a good method of teaching geography must be a very valuable feature in the schools for the people. Not even history is so full of practical lessons for the youth as his geography.

The age is an age of newspapers. We must have the child in the schools able to read the newspaper intelligently. Geography, next to reading, is the most practical study for this purpose. Through the window furnished by the morning newspaper the citizen looks out daily upon the entire process going on in the world. He sees the doings and sufferings of his fellow-men, and also the natural occurrences worthy of record. Every morning, therefore, the citizen readjusts his feelings and thoughts in view of the whole world. Once it was only village gossip to which he adjusted his life; now it is world gossip in the newspaper. The former was narrow and trivial, the latter is broad and of serious import. The former related to the doings of one's neighbors, mostly their private affairs that concerned no one but themselves. The world gossip relates to the doings of nations and the calamities or blessings that come to large populations, like cities and provinces, and we are all concerned in them.

Subtract the geographical knowledge, poor as it is, from the minds of our people, and at once their newspaper reading loses one half of its virtue. Vague and fantastic notions take the place of just and accurate ones. The study of maps is more important to the youth in Great Britain than to any youth on the Continent. He must know geography extensively to form any idea of his national possessions. His flag is found in all climes. It is as necessary for American youth to know geography as for British youth, because we occupy the entire width of a continent and several different belts of climate north and south with our people, every section of which co-operates in making the laws for all the rest. The pupils in our schools need especially the knowledge of the natural and manufactured products of each part of the world, and of the manners, customs, and political ideas of each people, in

order that they may partake intelligently in the formation of that public opinion by which we are governed and of which the newspaper is the organ.

I have already spoken of the first beginnings of arithmetic, describing the Grube method used in some of our schools. Warren Colburn, by his little book on mental arithmetic two generations ago (1821), made a great departure in the methods of teaching this branch of the course of study. In its essence it was not widely different from the method named from Grube, for it studied processes with the aid of small numbers that could be carried "in the head" without the aid of slate and pencil. Grube, as we have seen, performs all the elementary operations on the numbers from one to ten, commencing with *one* first, and then taking up in order two, three, four, etc. It is likely enough that Grube's method is one of the many echoes of Colburn's book, which was translated into several languages, and sold one hundred thousand copies per annum in America and half of that number in Great Britain.

Inasmuch as Colburn's Arithmetic could not supersede entirely the so-called "written arithmetic" that required slate and pencil, it followed as a result that American schools fell into a habit of having two arithmetic lessons a day from each pupil, the one in "mental" and the other in "written" arithmetic.

The report to the Bureau of Education already referred to shows that arithmetic still receives more attention than any other branch. The amount of time used varies from 600 to 2,240 hours, with an average of about 1,190 hours—that is to say, from 75 to 280 hours per year, with an average of 150 hours. No other nation gives so much time to arithmetic as we do. The question naturally arises whether we get corresponding results in the mastery of this difficult branch, and whether so much arithmetic strengthens or weakens our national character on the whole.

Opponents of this extra study of arithmetic have recently arisen. General Francis A. Walker, when on the Boston School Committee, made a powerful protest against it. But the directors of education at large have not been moved to make changes as yet, although it is probable that they have had their confidence shaken in the wisdom of the present policy. In my own opinion, General Walker and his supporters are right in their criticism, although perhaps not politic in some of the reasons which they give; for they contend that the pupil should not take up so much time with mathematical puzzles. This gives the conserva-

tive teacher an impression that the new departure proposes to lower the standard of our pupils in this important branch. I do not think that the proposal of General Walker contemplates any such consent to a lower standard of results. But the allusion to "mathematical puzzles" has led to the surmise that something is to be sacrificed in this department.

In my school report of the St. Louis public schools for 1869 (pages 107–109) I attacked the old practice of requiring so much arithmetic for admission to the high school, on the ground that time was taken up solving problems by arithmetic which ought to be solved by algebra. "Very high percentages are required of pupils before promoting them to the next higher grade in the course. It has not been sufficiently considered that there is a limit to the thoroughness desirable in arithmetic; that the time consumed in securing such high standards of thoroughness would have been better used by the pupil in mastering higher methods. Instead of solving the problems of higher arithmetic by arithmetical methods, he could more wisely have 'flanked' them through algebra and trigonometry, and these latter studies would have opened up to him new worlds in mathematics."

No doubt there is too much time spent on arithmetic for the results achieved. More mathematical power might be attained by taking up algebra sooner. But the results on character are still worse than the mathematical results. It was contended by zealous teachers in the early days of the new departure in favor of Colburn's Arithmetic that it taught logic and secured general intellectual power. Since the days of Sir William Hamilton's essay against Whewell's estimate of the value of mathematics in higher culture, educators have been led to consider more carefully the kind and quality of intellect developed by the study of arithmetic. The idea of quantity abstracted from quality is used in arithmetic and algebra. In pure quantity there can not be employed either of the three figures of the regular syllogism, because there can be no subsumption of the subject under the predicate. When we say "man is mortal," man is subsumed under the class mortal. When we say "six plus six equals twelve, or, twelve divided by four equals three," we do not subsume one term under another, but affirm abstract equality or inequality. Hence pure arithmetical processes do not employ the syllogism, at least in the forms used in reasoning about concrete affairs.*

* St. Louis School Report for 1866–'67, pp. 62–64; ditto for 1871–'72, pp. 144, 145.

In fact, the devotion of too much time to the contemplation of the quantitative aspect of things at an early age has a deleterious effect on the other and higher powers of the mind, such, for example, as give one ready insight into human nature, into moral truths, or into the higher order of poetry, or into theology. And yet one must be careful and not lose sight of the indispensable character of this branch in the course of study. Although it usurps more room at present than is healthful for our pupils, yet its legitimate place is not second to any in our course of study; for the knowledge of counting and other operations with numbers is a knowledge that makes possible the conquest of Nature. We divide and conquer. Arithmetic enables us to invent all of our arts by which we create and accumulate and exchange wealth. It enables us to inventory Nature for the purposes of science. It is an instrument or "tool of thought" utterly indispensable; but it is not the only indispensable tool of thought.

Turning from arithmetic to grammar, we find a great falling off in the amount of attention it receives compared with the time given it a few years ago. The 82 cities report a very large substitution of "language lessons" for technical grammar. Grammar proper gets from 65 to 680 hours of the course, with an average of about 300 hours. This would give from 8 to 80 hours, with an average of 38 hours per year, if distributed over the entire course. But it is evident that grammar proper is, as a study, not profitable to take up until the seventh year of the course of study. But the language lessons, which are practiced in all the grades above the lowest two, more than compensate for any curtailment in technical grammar and "parsing."

The most important new departure in the teaching of grammar occurred about 1848, on the appearance of Samuel S. Greene's Analysis. It turned the attention from the dry formalities of "parsing" to the more concrete analysis of the logical processes of thought underlying the sentence. Subject and predicate and copula and modifiers (adjective and adverbial) formed the categories of a kind of science of the operations of the mind in thinking and expressing itself in language. But, like the mental arithmetic a quarter of a century earlier, this really good move in the study of language was pushed into absurd extremes by its enthusiastic friends. Grammatical analysis was made to get in the way of everything else, except arithmetic, which held its place defiantly. There is no question but that the logical training received in the study of "analysis" was vastly superior to that derived from

arithmetic. I can remember how it was forced upon my attention in St. Louis in the early years, after the civil war, when many new teachers were engaged, that those who passed on a high standard in grammatical analysis turned out versatile in resources and excellent dialecticians—i. e., excellent at cross-questioning their pupils in recitation and arousing sluggish intellects.

The overestimate of technical grammar has caused a reaction against it; and although the city school systems are very conservative on the whole, yet there is a movement in favor of a reduction to a minimum as regards "technical grammar," and an expansion of sentence-writing and compositions and letters.

Were grammar only for teaching how to write and speak correctly, of course technical grammar might give way altogether to language lessons. But the chief use of grammar is its power to give the pupil an insight into the structure of the mind; not under that description, it is true, but nevertheless in reality an insight into the nature of what is mental as opposed to what is material.

Mathematics gives an insight into the nature of matter and motion, for their form is quantitative. But the form of mind is consciousness—a subject and object. It is always engaged in predicating something of something, always modifying something by something, and the categories of this mental operation are the categories of grammar, and appear as parts of speech. The child by the study of grammar gets some practice in the use of these categories that gives him unconsciously a power of analysis of thoughts, motives, and feelings, which is of the most practical character.

History, which gives us insight into human nature as it is manifested in social wholes—tribes, nations, and peoples—is a study of the elementary school, usually placed in the last year or two of the course, with a text-book on the history of the United States. The returns from the 82 cities show that this study everywhere holds its place, and that it receives more than one half as much time as grammar. Considering the fact that grammar is begun a year earlier, this is better than we should expect. With history there is usually joined the study of the Constitution of the United States for one quarter of the year. Besides this, some schools have taken up a special text-book devoted to civics, or the duties of citizens. History ranges from 78 to 460 hours, with an average of about 150.

General history has not been introduced into elementary schools, except in a few cases by oral lessons. Oral lessons on

physiology, morals and manners, and natural science have been very generally introduced. The amount of time given in 66 cities to physiology averages 169 hours; to a course of lessons in morals and manners in 27 cities is 167 hours; to natural science on an average in the 39 cities that give a systematic course of lessons, 176 hours.

Singing is quite general in all the schools, and the pupils are taught systematically to read music in 75 cities out of the 82. The time devoted to it is on an average 363 hours. Writing is set down by 80 cities as using an average of 559 hours out of the entire 7,000 hours.

Sewing is taught in 11 cities, with an average of 163 hours devoted to it. Lessons in cookery are reported in New Haven (80 hours); and Washington, D. C. (114 hours). It is also taught in Boston, and many other cities not reporting it in the list of 82.

Physical culture is very generally taught. Of the 82 cities, 63 report it as receiving on an average 249 hours.

Secondary and Higher Institutions.

It is of little use to spread out the endless details of a course of study in secondary, higher, and special education before a person who has not formed for himself some ideal of the necessary principle that underlies the selection of such lines of study. Unlimited arbitrariness and caprice seem to reign until one gets hold of the rational idea that works in such selection of branches for the pupils in different grades. This rational idea works unconsciously in the minds of most educators, just as a hundred other rational ideas work in the social and political history of mankind, providentially building institutions that will secure a greater degree of freedom and individuality in the future. He who has not yet thought of unconscious ideas at work in human society has yet to learn the alphabet of sociology, politics, and history. To some psychologists *unconscious ideas* would be a contradiction. The trouble is with the narrow conception of the meaning of idea, and with the ignoring of the Providential Mind that moves underneath and above the tides of human history, not to constrain, but to work out through man's freedom the divine purpose. Providence is so deep a principle that it, as Emerson says,

> "Grows by delays, . . .
> And, by the famous might that lurks
> In reaction and recoil,
> Makes flame to freeze and ice to boil!

Forging, through the swart arms of Offense,
The silver seat of Innocence."

The study of the philosophy of history reveals everywhere the coming to consciousness of ideas. First they begin as a blind impulse that goads a people to actions not wholly motived or understood by themselves or others. As the blind impulse works itself out into results a higher degree of consciousness is attained by the people—for a people learns what is in its innermost nature by seeing what it has done and therefore can do. Blind impulses become feelings and sentiments, and then some poet turns them into symbols, and the theologic mind into ideas. But long before reflection has found the clear ideas, they are at work in the people's institutional action as molding forces. The Darwinians call this "natural selection," and the expression is good enough to show the way in which these guiding ideas manifest themselves in the unconscious stage. Being in harmony with the fundamental cause of all Nature and with Reason itself, they get chosen in preference to other possible alternatives that look just as well on the surface, but are not continuous one with another nor with the unity of the whole. These ideas are self-consistent forms of realization by which Reason makes Nature as a whole.

The student of education therefore finds a rich field of study in the history of educational systems. He finds everywhere some general conformity to a principle deeper than the organizers saw.

Take as one example of this the distinctively American feature of instruction by means of text-books. In no other country is there so much of it. Seeing its obvious abuses, all our educational reformers from Horace Mann downward have condemned it, and held up as the true model the oral instruction of the German schools. But meanwhile text-book use has gone on, and foreign critics still accuse us of doing little in our schools except causing the pupil to memorize (or "cram") the text of the printed page.

Turning to the great social evolution at work in the nineteenth century, we have an explanation of this blind instinct which clings to the text-book in the school, and makes the American school have the one distinguishing trait of devotion to the printed page. For the age is intent on individual self-help, and the greatest means of all self-help is the printed page of book or newspaper. Oral instruction teaches the pupil how to depend on another person for information. The book frees him from personal control, and habituates him from the earliest years of his youth to get his data from an impersonal source and criticise it, or supplement its

deficiencies from his own experience. Hence the American text-book method is not radically wrong, but right. Its shortcomings are found in carrying it out in practice; for cramming the words of the book and repeating them without explanation or independent illustration are as foreign to the idea of the American method as they are to the German oral method. The ideal of the American method is to set the pupil at work helping himself by the aid of the book; to show him how inadequate are his efforts at getting out of the book what it contains by means of the recitation wherein the pupil is examined on his knowledge of the subject of the lesson, and made to state over again in his own words its substance. The teacher is there to help him criticise the statements of the book, so that he shall not acquire a blind faith in what is printed, but fearlessly compare it with other authorities and put it to tests of experiment and research.

In short, the American characteristic of text-book instruction is the preparation of a people for a newspaper civilization—an age wherein public opinion rules. The statesmen follow public opinion instead of create it, in a newspaper age. All people seeing clearly the same facts, and reading the same commentaries presenting all phases of consideration, are able to arrive at harmonious conclusions. These again are reflected in the newspaper, and the men in power see their policy decided for them, as the Greeks and Trojans before Troy saw the great scales suspended in the hands of Zeus and the two causes weighed and decided by sovereign Wisdom and Might.

All can see defects in the newspaper, but its unconscious ideal too few have endeavored to find. The educator, however, recognizes the adaptation of the American text-book methods to the American rule of public opinion and independent decision in view of the whole. Without a view of the whole such decision is dangerous. The freest competition of all parties, denominations, and interests in reaching the attention of the people is the safety of the whole movement.

In the survey of actual instruction in the public schools of eighty-two cities containing one fourth of all the pupils of the country, we have seen the position that reading, spelling, writing, arithmetic, geography, grammar, and history occupy. The question next arises as to what the secondary schools that continue this education actually study and what they ought to study.

It will be noticed that the studies of the elementary school relate chiefly to the technicalities of reading, writing, language, and

mathematics. Looking for the application of this technique, we see two worlds—Nature and man. Nature contains, first, abstract or inorganic objects, matter, and motion, to which arithmetic, algebra, and higher mathematics relate; then, secondly, it contains organic objects, like plants, animals, and men. This phase of Nature, including vegetable and animal growth and the requisite conditions of climate, land and water, and air, are treated in geography.

Hence the child has two studies that give him an insight into Nature as the support of his life and as the instrument for him to conquer and use in the shape of machinery, motive powers, food, clothing, and shelter. With his first lesson in arithmetic he learns something fundamental about the conditions of existence in time and space. Matter and force not merely happen to obey mathematical laws, but they *have* to do so as a primordial necessity of their nature. Every lesson in geography from the first is of practical use in giving the child command over organic Nature.

Taking the other side of school instruction, we find a happy selection of what reveals man to himself. Man as an object is body and soul; the body is a physiological object, like animals and plants. The soul is intellect, will, and feeling. The child does not study psychology as such, but something better for him than psychology, for he studies the products of man's intellect and will and feeling. He studies the structure of language in grammar, and this reveals the structure of intellect. He studies in literature the revelation of the human heart—its feelings, emotions, and aspirations, good and bad. Literature portrays the rise of feelings and their conversion into actions and ideas by the will and intellect; finally, it shows the collisions of evil feelings with good. History, again, shows the human will in its distinctive province, for the will of man is manifest not so much in individual adventures as in the formation of states and religious movements and social changes. This is collective will, the will of the nation or people, and it is manifest in wars or in great social movements, such as colonization, the building of cities, internal improvements, commerce, productive industry, etc.

History reveals man to himself by showing him his deeds. Literature reveals man to himself by showing him his character in its process of formation—the ultimate springs of action as they well up from the unconscious depths of the soul. Grammar, philology, and language studies reveal the essential structure of the soul—its logical constitution as a self-activity or self-consciousness.

Vassar College, Poughkeepsie, New York.

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There are no other phases of Nature and Man than these five, which we see are contemplated by the five chief branches of study in the district schools.

Secondary education must go on in the same course, opening windows of the soul in five directions, so that the pupil gets a better insight into these cardinal provinces of Nature and man.

Therefore, the secondary pupil should continue his study of mathematics, taking up algebra and geometry; of language, studying the ancient languages from which civilization has been transmitted, and modern languages. He should continue the view of organic Nature given in geography by studying the outlines and methods of such natural sciences as geology, astronomy, physiology, zoölogy, and botany; continue history by adding to the special study of the United States, begun in the elementary school, the study of general history; continue the study of literature, begun in the school readers, by systematic study of the greatest writers, Shakespeare, Milton, and others, in selected complete works of art, together with a history of literature. Mathematics are re-enforced by physics (called natural philosophy), treating of the mathematical laws of solids and fluids.

To these branches which the ideal course should contain there are certain incidental studies of a useful character, such as vocal music, bookkeeping, calisthenics, shorthand writing, cookery, wood-working, etc., which are added, some of them, to the high-school courses of study throughout the country. The modern languages taught are usually German and French. The ancient languages are Latin and Greek.

It must be noticed, in studying the secondary education of the United States, that it stands between two other self-regulated systems of schools—the elementary, whose course is determined by the school committees, and the higher, whose course is determined by college faculties and boards of trustees. These two independent directive powers do not act in perfect harmony. Hence the secondary school has a twofold course of study to provide for—that indicated by the elementary school and that required by the college for admission.

But the public high schools are under the control of the school committees elected by the people. This causes them to lay more stress on a continuation of the fivefold course of the elementary schools than on the studies required for admission to college.

On the other hand, the private secondary schools lay the most stress on preparation for college. Here is one of the greatest

defects in our system, or lack of system. The ideal course of study demands that five windows of the soul be kept open. The old preparatory school laid stress on Latin, Greek, and mathematics, neglecting all else. These three branches opened only two or three "windows" (to keep up our metaphor); mathematics gave the key to inorganic Nature; Latin and Greek answered to grammar and literature—chiefly to grammar, or the logical side of the soul, with a little touch of history and literature on the sides of the will and sensibility. Nature was left out of sight, except as mathematics gave the general conditions of all Nature—the structure of time and space.

The private secondary school, therefore, in the last generation slighted history, modern literature, natural science, and sociology. The public high school undertook to develop these important sides of a rounded education, and succeeded in a measure; but it was obliged to adopt another course of study for its pupils fitting for college. Hence there arose a general or English course, and a classical course.

I have compared the classical course of study to a palm tree, which first builds a tall stem, and then suddenly expands into foliage at the top. So the preparatory school and the college required six years (four in the preparatory and two in college), to be devoted almost exclusively to Latin, Greek, and mathematics, and then, in the last two years of the college, made a hasty survey of Nature and modern literature and history as a sort of finishing touch.

There is no doubt that the high-school course laid out by the school committees is more rational than the secondary course of the private preparatory schools prescribed for them by the colleges; and yet the college course was the conscious product of the highest educated minds of the community. The unconscious evolution by "natural selection" in the minds of school committees elected by the people was wiser on the whole. Individual members of city school boards are always found who oppose classic study altogether; but the pressure of popular demand often prevails to secure in the public schools what is needed.

The difficulty in this case is that the high-school pupil, taking up all the five branches—mathematics, natural science, history, modern literature, Latin and Greek—in his four years, is not so far advanced in the classic languages as the special preparatory school, and does not compete with it on an equal footing. Special

classical courses in the public high school are a costly experiment wherever carried on.

This produces what we may call a national disaster in our education, namely, the discouragement of high-school pupils from taking up higher education. The public high schools, in proportion to their enrollment, send comparatively few to the colleges.

The disadvantages of this to the nation are great; for higher education, even with a "palm-tree" course of study, educates the majority of the real leaders of society. It might be supposed that those best versed in natural science would have this prestige, and doubtless natural science counts for much; but the classically educated man has advantages over all others. That this should be so may be seen by a brief consideration of the rationale of its course of study.

We have noted that there are needed five windows in the soul to see the five classes of objects in Nature and humanity. Natural science relates chiefly to the organic and inorganic phases of Nature, but gives but little insight into human nature. On the other hand, language-study, and especially literature, lead directly toward this knowledge of man that is essential to large directive power.

As to the dead languages, Latin and Greek, they are the tongues spoken by the two people who invented the two threads united in our modern civilization. The study of Greek puts one effectively into the atmosphere of art, literature, and science, in which the people of Athens lived. This is the effect of Greek literature; it is also the effect of the mere language in its idioms and in its grammatical structure.

The study of Latin puts one similarly into the stern, self-sacrificing, political spirit of Rome. The Romans invented laws for the protection of life and private property, and also the forms of combination into corporations and local governments. To study Latin makes the pupil more attentive to, and conscious of, the side of his civilization that deals with combinations of men into social organizations.

No other ancient or modern language gives us anything of equal value for gaining an insight into the institutions under which we live except the study of the Bible. The Hebrew thread of our civilization is still more important, because, while the Roman secures civil freedom, and the Greek intellectual freedom and artistic taste, the Hebrew oracles give us the revelation of the personality of God, the fountain of all freedom; for, unless the

Absolute is a free personality, man's freedom must be all a temporary and abnormal affair; the iron fate which pantheism sees as the First Principle will get the advantage, after all.

With this in view we see that the colleges ought to continue to lay chief stress on Latin, Greek, and mathematics as the studies that foster directive power; but they ought to add also the three moderns—natural science, modern literature, and history—incorporating them into the course throughout, so that the oak rather than the palm tree becomes the symbol of the education.

By "directive power" is meant the influence that molds the actions of men. This may be done by the lone scholar who publishes great discoveries to the world; by the editors of periodicals; by the orators, preachers, and teachers; and especially by the poets and literary men.

There has been a process of adjustment going on in higher education in several directions, especially since 1870. First an elevation of the standard of admission took place, chiefly brought about by the action of Harvard College. Secondly, an extension of the scope of elective studies as a consequence of the raised standard which now brought the Freshmen class nearly up to where the Junior class had been. Thirdly, the requirements for admission began to be more varied, and to require something of English literature and a modern language, with some natural science and history, but much more Latin and Greek.

Had the Latin and Greek requirements remained the same, the new standard of admission would have fitted the course of study of the higher school, and the problem would have been solved. As it is now, the situation of the high school as a feeder for the college is worse than before 1870.

Another change in higher education developed within the past twenty years is the organization of post-graduate study into a real university. Before this the United States possessed universities only in name, for there was no organized post-graduate work. The special professional school for law, medicine, and theology did not require the degree of A. B. for admission, but received many direct from the secondary schools.

Many of the larger colleges have been conspicuous in this movement, but the new university of Johns Hopkins has taken the lead, on the whole. The problem was to differentiate the work of the post-graduate course from the "academic" work of the college proper. This was effected at Johns Hopkins by making th

work of the post-graduates wholly that of original investigation. This took three directions: (*a*) that in books and special libraries —the so-called seminary work; (*b*) that in the laboratory, in the way of experiments and verifications; and (*c*) in the field, in the way of investigation of the practical workings of home institutions—such, for example, as boards of public works (sewers, roads, gas, etc.), and the exploration of public records and local history. The "seminaries" held are discussions of the essays or theses submitted by the members, which embody the results of their research.

Thus an important advance has been made in the way of adding post-graduate work of a different order from the work of the undergraduate. The undergraduate continues the work of the secondary and elementary school, and aims at culture, namely, the power to see the unity and system in all human learning—it is the course in "philosophy," as it is properly called. The post-graduate work is specializing; it is original investigation. It properly completes the system of education, because it places the higher education in contact with the practical problems of the people.

This university work has had an application in a "new departure," called "university extension," which may be considered as having important forerunners in the summer schools founded by Harvard University and other parties more than twenty years ago—one of which, the Anderson School of Natural History, founded by Agassiz on Penikese Island, is famous. It consists in lectures on the part of university men given in localities scattered about the country within convenient distance. It began with Cambridge University, in England, and was taken up also by Oxford. It has the inestimable advantage of educating the people at large, who are coming to have a common-school education universally, and giving to them a knowledge of what is done in the highest education, as well as a respect for its methods and results. One of the dangers of popular elementary education is by this met and neutralized. The most active intellects among the masses of the people are given to hobbies of various kinds. Hobbies may be defined as partial views and incomplete theories set up for whole and complete. The university-extension movement meets everywhere the so-called "self-educated" man, and helps to correct any one-sidedness of views that may exist.

In modern representative government, extending more and more widely here and in Europe, there is political evil, not to say

danger, from partial views arising from lack of thorough grasp of theory, or a neglect of the history of the subject. There are the various phases of socialism, attacks on the ownership of land; opposition to classic study; the partisanship of pure science to the neglect of the humanities; the advocacy of an exclusive "greenback" currency; or the unlimited coinage of silver on a basis of value different from that of the market of the world. Sincerity is not a proof of truth, but it makes converts among uneducated people with active intellects. The university-extension movement meets these conditions and does good. There has been an adoption of this movement in this country by many higher institutions, and chiefly by the University of Pennsylvania.

The public library has become one of the chief educational forces in the community. As long ago as 1876 General Eaton, then Commissioner of Education, collected the statistics of 3,647 public libraries, and on revising the list ten years later extended it to 5,328 libraries. The aggregate number of volumes in these 5,328 libraries was 20,622,078 volumes. Massachusetts took the lead, with 569 libraries, containing 3,560,085 volumes. Next came New York, with 2,168,508 volumes in 780 libraries. It is not, however, the increase of libraries that is so remarkable; it is the increase of a class of professional librarians who are fruitful in new methods of making their collections useful to the people at large.

A new report on libraries, now in press, returns for 1891 3,804 public libraries of 1,000 volumes and upward, with an aggregate of 31,176,354 volumes, the same being an increase of 817 libraries (over 1,000 volumes each) and 12,111,280 volumes since 1885. This is 34 books to each 100 of the population. In 1891 three States report over 1,000,000 volumes in public libraries of 1,000 volumes and upward—namely, Massachusetts, 3,353,229 in 427 public libraries; New York, 2,900,639 in 397 libraries; Pennsylvania, 1,770,600 in 286 libraries. Ohio follows next, with 989,485 volumes in 157 libraries.

The school teaches how to read, the library furnishes what to read, and turns life into a continuous university. The reader who visits the library to study a special topic is provided with indexes showing what books and what articles in periodicals have treated of it.

American education has reason to be proud of the benefactions made to it during the past fifty years. In the founding and providing for public libraries, in the establishment of schools for manual training, and especially for colleges and universities, very

large sums are given annually. Here is a table showing what has been reported by the Bureau of Education since 1871:

Year.	Endowments.	Year.	Endowments.
1872	$6,282,461	1882	Not known.
1873	8,238,141	1883	$3,522,467
1874	1,845,354	1884	5,688,043
1875	2,703,650	1885	5,134,460
1876	Not known.	1886	2,530,948
1877	1,273,991	1887	Not known.
1878	1,389,633	1888	6,646,368
1879	3,878,648	1889	6,942,058
1880	2,666,571	1890	Not known.
1881	4,601,069	1891	9,202,957

The amount for twenty years is something over $80,000,000, or an average of $4,000,000 a year.

If the benefactions should be directed in the line of founding fellowships, yielding a support to those post-graduates that form the corps of students at the universities engaged in original investigations and in studying existing institutions, there will be great progress made in the coming decade; for the body of post-graduate students at a university create for it the desirable atmosphere of learning and serious occupation with the problems of life.

There is one educational institution that is differentiated from the high school and preparatory school in its methods, and yet it is scarcely ranked among the colleges and universities. I refer to the normal school. It receives in the majority of cases not only graduates of secondary schools, but also those of the proper age who have had no education except in the elementary school.

But the method of the normal school is the comparative method, which I have described as the characteristic of the college. Its chief work is a review of the studies of the elementary school in the light of higher branches. It studies arithmetic, but deduces its rules from algebra and geometry; geography it explains from geology, astronomy, meteorology, botany, zoölogy, and sociology; reading, from rhetoric and the history of literature; grammar, from logic and comparative philology. It conducts its exercises with a strict observance of all the forms that are necessary for the management of a primary school. The result of its discipline and instruction is the formation in the mind and habits of its pupils of an ideal of the proper conduct of a school. Thoroughness of explanation, clearness of ideas, and a constant atten-

tion to behavior, are characteristics of the teachers educated at normal schools of repute.

It must be noted that it is the ideal of a well-managed school, rather than any study of the history or science of education, that gives superiority to normal graduates. For the effect which a good normal school has upon its pupils, I am disposed to place this class among institutions of higher education..

The report of the Bureau of Education for 1890 returns the following secondary and higher institutions for the whole United States:

	Number.	Total students.
Secondary Education.		
Public high schools	725	220,442
Private secondary for boys	297	26,409
" " for girls	290	26,497
" " for both sexes	737	93,655
Total secondary	...	367,003
Normal schools, public	138	28,110
" " private	46	5,051
Total normal schools	...	33,161
Higher and Professional Education.		
Colleges for women	198	26,945
State universities	28	12,846
Colleges of liberal arts	384	35,296
Schools of science (United States land grant)	32	9,621
Law schools	52	3,906
Medical schools	106	13,397
Theological schools	141	6,989

EDUCATIONAL ORGANIZATION; NATIONAL GRANTS; COMPULSORY EDUCATION; SECTARIAN DIVISION OF SCHOOL FUNDS; SUPERVISION; SPECIAL SCHOOLS; KINDERGARTENS.

The European inquiring about schools always asks concerning the laws and regulations issued by the central Government at Washington, taking for granted that things of such interest as education are regulated by the nation, as in Europe. The central Government with us, however, has never attempted any control over education within the several States. It is further than ever from any such action at the present time. The idea of local self-government is that each individual shall manage for himself such matters as concern him alone; that where two or more persons are concerned, the smallest political subdivision shall have jurisdiction and legislative powers; where the well-

Smith College, Northampton, Massachusetts.

being of several towns is concerned, the county or the State may determine the action taken; but where the interests of more than one State are concerned, the nation has ultimate control.

While the General Government has not interfered to establish schools in the States, it has often aided them by donations of land, and in some cases by money, as in the acts of 1887 and 1890, which appropriate annual sums in aid of agricultural experiment stations and increase the endowment of agricultural colleges which were established in 1862 by generous grants of land.

The total amount of land donated to the several States for educational purposes, since 1785 to the present time, is shown as follows:

1. *For public or common schools*—Every sixteenth section of public land in States admitted prior to 1848, and the sixteenth and thirty-sixth sections in those since admitted, 67,893,919 acres.

2. *For seminaries or universities*—Two townships in each State or Territory containing public land, 1,165,520 acres.

3. *For agricultural and mechanical colleges*—Thirty thousand acres for each member of Congress to which the State is entitled, 9,600,000 acres.

Total number of acres, 78,659,439. At the rate of one dollar and a quarter an acre (the traditional price asked by the Government for its lands), this amounts to about $100,000,000.

Besides this, a perpetual endowment by act of 1887 is made of $15,000 per annum for agricultural experiment stations connected with the agricultural colleges, and $25,000 perpetual additional endowment by act of 1890 for the colleges themselves. This is equivalent to a capitalized fund of $1,000,000 at four per cent for each State and Territory, or about $50,000,000 in addition to the amount above mentioned.

The General Government supports the Military School at West Point, established in 1802, to which each congressional district, each Territory, and the District of Columbia is entitled to send one cadet, and the President appoints ten additional. Each cadet receives $540 a year to pay his expenses. (The course of study is four years. The number of graduates between 1802 and 1876 was 2,640, about fifty per cent of all admitted.)

The United States Naval Academy at Annapolis was established in 1845. Its course of study in 1873 was extended to six years. Cadets are appointed in the same manner as at West Point.

The General Government provides for the education of the children of uncivilized Indians and for the children in Alaska.

There have been, besides the general grants referred to, special grants of land for educational purposes, such as "swamp lands" (acts of 1849, 1850, 1860), by which 62,428,413 acres were given to fourteen States—Alabama, Arkansas, California, Florida, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Ohio, and Wisconsin—and by some appropriated to education.

By the act of 1841 500,000 acres were given to each of sixteen States (including all above named except Indiana and Ohio, together with Kansas, Nebraska, Nevada, and Oregon). This gives an aggregate of 8,000,000 acres, the proceeds of most of which was devoted to education. The surplus funds of the United States Treasury were, in 1836, loaned to the older States for educational purposes to the amount of $15.000,000, and this fund constitutes a portion of the school fund in many of the States.

The aggregate of lands and money given for education in the several States is therefore upward of $200,000,000.

In 1867 Congress established a National Bureau of Education, "for the purpose of collecting such statistics and facts as shall show the condition and progress of education in the several States and Territories, and of diffusing such information respecting the organization and management of school systems and methods of teaching as shall aid the people of the United States in the establishment and maintenance of efficient school systems, and otherwise promote the cause of education throughout the country." This bureau, up to 1892, has published about two hundred separate volumes and pamphlets, including twenty-one annual reports (varying from 800 to 1,700 pages each).

The policy of the national Government is to aid education, but not in any wise to assume its control.

The several States repeat in form the national Constitution, and delegate to the subdivisions—counties or townships—the management of education. But the State possesses centralized power, and can exercise it when the public opinion of its population demands such exercise.

Compulsory Education.—Even in colonial times, as far back as 1642, a compulsory law was enacted in Massachusetts inflicting penalties on parents for the neglect of education. In the revival of educational interest led by Horace Mann in the years after 1837, it was felt that there must be a State law, with specific provisions and penalties, and this feeling took definite shape and pro-

duced legislative action. A truant law was passed in 1850, and a compulsory law in 1852, requiring a minimum of twelve weeks' attendance on school each year for children between the ages of eight and fourteen, under penalty of twenty dollars.

In the Connecticut colony in 1650 the Massachusetts law of 1642 was adopted. Amendments were adopted in 1805 and 1821. By a law of 1813 manufacturing establishments were compelled to see that "the children in their employ were taught to read, write, and cipher, and that due attention was paid to their morals." In 1842 a penalty was attached to a similar law which forbade "the employment of children under the age of fifteen years, unless they had been instructed in school at least three months of the twelve preceding."

The efficiency of these early laws has been denied because cases of prosecution have not been recorded. But law-abiding people do not wait until prosecuted before obeying the law. I can remember quite vividly that in eastern Connecticut, in the region of cotton manufacture, the children came from the mill populations in large numbers every alternate winter. Their parents obeyed the law to the letter; for the legal interpretation of the words "three months of the twelve preceding" permitted alternate years to be taken for the three months. It was a forced construction in which "twelve months" was construed as meaning a calendar year. Of course, all pupils who had attended the three months' school the previous calendar year were legally entitled to employment the whole of the present year, and would have to attend another three months at the beginning of the next year following.

The actual observance of this law and the ingenious method of avoiding one half of its intended provisions is a matter of youthful recollection on my part, and I set it down against the sweeping assertions made by Connecticut State officers to the effect that the compulsory law of the State was a dead letter, alleging as a ground for this conclusion that they had never heard of a case of prosecution. The existence of a reasonable law is sufficient to secure its general obedience in most parts of the United States. But in the absence of any law on the subject the parents actually yielded to their cupidity and did not send their children to school. I can remember the small representation in the rural school from the "factory village" before the law, and the sudden influx of pupils after the law of 1842. The efficiency of a law is to be found in its results; and if twenty parents in a district sent their children to

school in obedience to the law, and would not otherwise have sent them, it follows that the law was very useful, though the twenty-first parent was obdurate and refused to send his children, and yet was not prosecuted for it.

This explanation of the workings of a compulsory law will throw light on the working of similar laws in the twenty-seven States and Territories that have passed them. There are exceptional localities in each State where an obnoxious law is openly and frequently violated, but the law is executed in all but a few places. In each locality, too, there are individuals who are disposed to violate the law and succeed in doing so, while all the citizens but a few obey the law because they have a law-abiding disposition. Abolish the law, and the number who neglect the education of their children will increase by a large per cent.

More and more attention, however, has been given in later years to drafting compulsory laws with provisions that are bound to be efficient. The advocates of these new laws are apt, in their pleas for more stringent regulations, to do injustice to the old laws. The following table shows what States have adopted compulsory laws and the dates of adoption (the earlier dates in Connecticut and Massachusetts being unnoticed, however, because they were partial in their terms):

State.	Year.	State.	Year.
Massachusetts	1852	Wyoming	1876
District of Columbia	1864	Ohio	1877
Vermont	1867	Wisconsin	1879
New Hampshire	1871	Rhode Island	1883
Michigan*	1871	Illinois	1883
Washington †	1871	Dakota	1883
Connecticut	1872	Montana	1883
New Mexico	1872	Minnesota	1885
Nevada	1873	Nebraska	1887
New York	1874	Idaho	1887
Kansas	1874	Colorado	1889
California	1874	Oregon	1889
Maine	1875	Utah	1890
New Jersey	1875		

* No law from 1881 to 1883. † No law from 1873 to 1877.

Sectarian Division of School Funds.—In connection with this matter of State compulsory laws against neglect of schools, it is well to mention the provisions made in the several States prohibiting appropriations of money to aid denominational schools:

1. *Constitutions which prohibit Sectarian Appropriations.*—Cali-

fornia,* Colorado, Florida, Georgia, Idaho, Illinois, Indiana,† Louisiana, Michigan, Minnesota, Mississippi,‡ Missouri, Montana, New Hampshire, North Dakota, Oregon,† South Dakota, Texas, Washington, Wisconsin,† Wyoming—twenty-one States.

2. *Constitutions which do not prohibit Sectarian Appropriations.*—Alabama,# Arkansas,# Connecticut, Delaware, Iowa,# Kansas, Kentucky,‖ Maine, Maryland, Massachusetts, Nebraska,△ Nevada,△ New Jersey,◊ New York, North Carolina, Ohio, Pennsylvania,# Rhode Island, South Carolina,△ Tennessee, Vermont, Virginia, West Virginia—twenty-three States.

3. *Constitutions which prohibit any Diversion of the School Fund.*—Alabama, Arkansas, California, Connecticut, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Washington, West Virginia, Wisconsin—thirty-six States.

There are forty States with constitutional provisions forbidding any (or at least sectarian) diversion of the money raised for the support of education.

School Boards.—The local boards in cities, towns, and districts which have the management of the schools are called "school committees" in four States—Massachusetts, Maine, New Hampshire, and Rhode Island; "school visitors" in Connecticut; "school directors" in Illinois, Indiana, Iowa, Louisiana, Oregon, Pennsylvania, Tennessee, Texas, and Washington; "school trustees" in Arkansas, Kentucky, New Jersey, and South Carolina; "school commissioners" in New York; "school boards" in Michigan, Mississippi, Missouri, Nebraska, Nevada, and Ohio; "prudential committees" in Vermont.

These boards are similar in their constitution, powers, and duties, and are generally chosen by the voters at elections. They

* Can make per-capita grants to institutions.

† Covers only religious and theological institutions.

‡ Prohibits any testamentary devise, bequest, legacy, or gift to religious, charitable, or ecclesiastical corporations or societies.

Sectarian appropriations can be made by two-thirds vote of all the members of both Houses of the Legislature.

‖ Has a revised Constitution pending popular adoption.

△ Prohibits sectarian instruction in public schools.

◊ Prohibits appropriations to societies, associations, or corporations.

are corporate bodies, and can make contracts, acquire, hold, and dispose of property.

They employ teachers (and superintendents, when such are deemed necessary) and fix their salaries. They make the rules and regulations for the government of the schools, and fix the course of study and the list of text-books to be used. They hold meetings monthly or oftener.

SUPERVISION.—There are county superintendents of schools in all those States where the county is a political unit for the administration of civil affairs other than come before courts of law. About thirty-five States have this form of organization; but in the six New England States and in Michigan the only supervision is township, and the counties in those States are units almost solely for the administration of justice through county courts. In Arkansas, Texas, and North Carolina the supervision is only that of the subdivisions of townships described as districts. Louisiana, Mississippi, and West Virginia have a modified township supervision. The county superintendents are elected by the people in only thirteen States. In the rest they are appointed by some State or county officers or chosen by the combined vote of the school boards.

Each State has a Superintendent of Public Instruction. He is so called in twenty-nine States; in others, "Superintendent of Common Schools," "of Free Schools," or "of Public Schools," "of Education," or "Commissioner of Public Schools." He is called "Secretary of the State Board of Education" in Massachusetts and Connecticut.

Eight hundred and thirty-six cities have superintendents of their public schools.

REFORM SCHOOLS.—There are fifty reform schools reported in the entire country, more than one half of which (twenty-seven) are in the North Atlantic division. There are seventeen in the North Central division, and two in each of the other divisions of States. The total number of youth in these reform schools is 19,790, of whom 3,383 are girls.

THE FEEBLE-MINDED.—Twenty-six institutions for the feeble-minded are reported, of which fifteen are in the North Atlantic States and eight in the North Central, and one in each of the other divisions. The entire number of feeble-minded pupils is 4,784, of whom 1,474 are girls.

THE EDUCATION OF THE BLIND.—There are thirty-three institutions for the blind reported in the whole country, of which

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Wellesley (Massachusetts) College.

the North Atlantic division has only four; the South Atlantic, eight; the South Central, eight; the North Central, ten; the Western, three. The total number of pupils is 3,134, of whom 1,330 are girls.

Education of the Deaf.—In the whole country there are seventy-four institutions for the education of the deaf, with a total of 8,156 pupils, 3,521 of whom are girls. In the North Atlantic division there are twenty-one; South Atlantic, ten; South Central, nine; North Central, twenty-eight; Western, six.

Nurses' Training Schools.—There are reported in all thirty-three schools for the training of nurses, twenty-five of these being in the North Atlantic division, six in the North Central, and one each in the Western and the South Atlantic.

Commercial and Business Colleges.—The Bureau of Education reports 232 business colleges, with an aggregate of 64,858 students, of whom 15,088 are girls.

Manual Training Schools.—There were, in 1889, seventeen fully developed manual training schools, after the model of one at St. Louis, organized by Prof. C. M. Woodward. The total number of students in these was 3,476, of whom 279 were girls. There were twenty-six cities that reported instruction in various branches of manual training, such as sewing, cooking, carpentry, wood-turning, carving, printing, clay-modeling, iron-forging, housework, with drawing in all cases. Something over 40,000 pupils were reported as taking the manual training course, nearly one third of them being in New York city. Boston, the city that inaugurated the movement, did not report its numbers, it seems, to the Bureau of Education.

Coeducation of the Sexes.—In both the Central and the Western divisions the education of boys and girls in the same schools is common, and exceptions are rare in the public schools. In the North and South Atlantic divisions many of the older cities continue to educate the girls in separate schools. In newly added suburban schools, however, coeducation is the rule (as in Boston, for example). In the rural districts of the Atlantic divisions, North and South, coeducation has always been the custom.

The Kindergarten.—This is the most popular of the new departures. The first city to incorporate the kindergarten with its public-school system was St. Louis, Mo. Boston had established one as a specimen—perhaps to show that the school was so expensive that it could not be generally introduced. For the year ending 1874 St. Louis enrolled 68 kindergarten pupils; in

1875, 271; in 1876, 1,041; in 1877, 3,333; in 1878, 5,359; and in 1879, 6,202.

The St. Louis kindergarten teachers were trained and their work supervised by Miss Susan E. Blow, a young woman of fortune, who devoted her time and wealth to the cause of Froebel's system. Hundreds of excellent teachers of kindergartens have come from her training.

The kindergarten has extended now to the number of 4,000 institutions in the 44 States, and as many as 60,000 children were reported in 1892, most of them being in private kindergartens. Boston in 1889 adopted into her public-school system the kindergartens supported for many years previously by Mrs. Quincy Shaw, at an annual expense of many thousand dollars from her private resources. In Philadelphia also there is a system of public kindergartens.

The kindergarten has a course of study adapted to the training of children two years younger than the pupils ready to enter the primary school. While the primary school receives the youth on completion of his sixth year, and gives him instruction in reading, writing, and arithmetic at once, the kindergarten receives the pupil at the age of four or five, and teaches him by "gifts," "occupations," and games. The exercises in cutting, folding, and weaving paper, embroidering with worsted, modeling with clay, etc., form the "occupations." The "gifts" are wooden cubes divided into sets of eight, and twenty-seven smaller cubes each one inch long. These are used to build with. The child exercises his fancy, and tries by the aid of the blocks, sticks jointed by the aid of soaked peas, and such devices, to make representations of houses, men, animals, furniture, and all manner of things with which he is familiar.

The games are performed by all the pupils of the kindergarten acting in concert. A ring is formed, and Froebel's Mutter and Kose Lieder are sung by the pupils and the games played, the teachers all assisting. Froebel understood the symbolic meaning of the early activities of the child, and has arranged in his Songs and Games an ingenious curriculum for the fourth, fifth, and sixth years.

Inasmuch as the great problem with modern education is to reach and civilize the population of the slums, the kindergarten promises to become a very important link in the school systems of cities. The earlier the child is brought under good influences the surer is his preservation from crime and pauperism.

There are two classes of children saved by the kindergarten which are in danger without it. The first are the children of the new wealthy people—persons of large directive power, but wholly taken up with adjusting themselves to the new duties which come upon them as they rise from one rank to another in society. Both parents are so absorbed by their responsibilities that they neglect their children and turn them over to governesses. The children inherit the directive power of their parents, and are precocious. They learn how to control the nurse and the governess, and are "spoiled children." If their entrance on school is delayed till the seventh or eighth year, they are found incorrigible in the primary school, and are sent home. If they attend the kindergarten two years younger, they are most generally saved. Their power of doing has full play in the kindergarten gifts and occupations, and when they come to the primary school they have tamed their wild humors and are eager for learning.

The course of the incorrigible child is early dissipation, waste of inherited wealth, and death. The most promising children born are those with precocious directive powers, if they can be civilized and their powers made reasonable.

The other class of children saved by the kindergarten are from the tenement houses without playgrounds except the sidewalks and streets of the city. Their parents have to neglect their family for work early and late. Their children become prematurely versed in the iniquities of the worst parts of the city, and have as a consequence a sort of arrested development such as characterizes the "gamin."

The missionary spirit governs educational systems more and more. The kindergarten teachers lead in this direction, and much good will come to the classes of schools above it from its influence.

The kindergarten, the manual training school, the post-graduate work at universities, the large benefactions for higher education, the multiplication of public libraries, the phenomenal increase in the circulation of newspapers and periodicals, the success of the Southern States in securing attendance on their schools, the study of infant psychology by teachers, the formation of teachers' reading circles for professional reading—these are in our day the auspicious signs of educational revival and progress in the United States.

CHAPTER VII.

SCIENCE IN AMERICA.

THE attempt will be made, within the narrow limits of this chapter, to set forth the present condition of scientific work in the United States of America. But the reader must bear in mind that, while the narrative is thus restricted, science is infinite. Accordingly, only a few significant facts can be mentioned in this place. Literally, science is the same as knowledge; properly, it means exact knowledge, systematically arranged, so that fundamental laws may be discovered or perceived. In this wide sense it is usual to speak of historical, political, moral, theological, legal, and philological science. But it is becoming more and more common to use the word science, when no epithet is employed, as restricted to the knowledge of Nature. In the following pages it will be so limited; attention will be directed to the study of animate and inanimate objects, the physical, chemical, and vital forces whose operations can be observed, and the laws which have been discovered by observation, experiment, and measurement. The study of forces, and to some extent the study of phenomena, depends more or less upon mathematics, so that mathematics must be included in the present survey. On the other hand, the applications of science to industry, including the wide range of inventions and manufactures, and the evolution of machinery, will not receive consideration. Medical science, also, will be passed by.

Many elaborate schemes have been prepared in order to give in one view a summary of the departments of human knowledge, but these schedules are seldom satisfactory, for this reason—the sciences are so closely related that it is not easy to define their limits. Shall astronomy be regarded as a branch of mathematics, or of physics? Is biology an independent science, or are its phenomena the manifestations of physical and chemical laws? Where does spectrum analysis belong—with chemistry, physics, or astronomy? Such problems as these the reader must study elsewhere. In these pages agencies, methods, and results are to be

considered without close reference to their logical interrelations. To those who are interested in such philosophical inquiries, an elaborate note in the Century Dictionary, under the word "science," may be particularly commended.

In looking at the scientific progress of any country five agencies may be examined, and five questions may be asked. These agencies are: (*a*) collections of books and specimens; (*b*) schools, colleges, universities, and learned societies; (*c*) apparatus, including the instruments required in laboratories and observatories; (*d*) researches, that is to say, independent investigations in respect to the facts and laws of Nature; and (*e*) publications by which ascertained results are placed in permanent records and made known throughout the world. Or, to put all this in the form of questions, if the scientific census of any country is to be taken, let the census-taker ask: How well equipped are the libraries and museums? Are the instruments of precision new, accurate, and the best that have been devised? Does the educational system encourage the study of Nature? Have persons of talent due encouragement in the prosecution of their researches? What journals and books record the progress of knowledge?

Let us begin by looking at the libraries and museums of this country. It may be worth while to say that, contrary to a prevalent opinion, libraries are as truly efficient factors in the promotion of knowledge as laboratories. Indeed, the proper conception of a great collection of books is a place for investigation and research, a working-room where students may acquaint themselves with the successful and the fruitless work of other climes and of other days. For the encouragement of such inquiries the libraries of this country have been liberally developed during the last half century, and especially within the last decade. It was in 1846 that the earliest great gift was made for the foundation of a public library in the city of New York, by John Jacob Astor. Its first superintendent, Dr. Cogswell, was a man of fine scholarship, incessant industry, and lofty ideals. He built up a library for scholars, a collection of books brought together for investigation; and since his day like institutions have grown up in many other places. The nobler universities and colleges of the country are fast acquiring collections which may indeed be surpassed in the number of volumes by the venerable foundations of Europe, and which are certainly wanting in the treasures of mediæval and ancient manuscripts like those stored up in Rome, Paris, London,

and Leyden; but the new institutions of the New World are rich in such costly and comprehensive works as the transactions of learned societies, the reprints of historical papers, the accounts of great voyages, the results of astronomical, physical, chemical, biological, and other scientific researches as they appear in every part of the globe. Not only the collegiate but the public libraries of the land are making similar acquisitions; and the liberality with which the financial support of States, cities, and private individuals is given for such objects awakens the admiration of all observers.

Figures convey but a very imperfect notion of the value of these libraries, fifty thousand well-chosen books being far more useful to a man of science than ten times fifty thousand ephemeral speeches, sermons, text-books, corporation reports, and novelettes; nevertheless, the number of books accessible in a given community, and the amount of money annually spent for new acquisitions, are signs that have a certain value.

Five great cities of the Atlantic seaboard—Washington, Baltimore, Philadelphia, New York, and Boston—are at the present time well supplied with books. Chicago will soon equal, and probably excel, in this respect the most favored Eastern city. Brooklyn, St. Louis, Cincinnati, and San Francisco have likewise important collections. But it is not only the great cities that provide unusual facilities for literary investigation. Smaller towns, like Cambridge, New Haven, Providence, Worcester, Princeton, Ithaca, Ann Arbor, and Berkeley, where universities are established, have noteworthy libraries. The library buildings which have been constructed for collegiate use within the last five years provide facilities for study worthy of the *clientèle*. In many other towns, especially in the State capitals, like Hartford, Albany, and Sacramento, great collections of books, especially of historical and legal works, have been amassed, but scientific libraries of a valuable character are brought together only where the scientific workers are. Essays, biographies, poetry, history, the drama, are attractive to all readers; but it is only the mathematician who demands mathematics, only the biologist who cares for elaborate monographs on the special organs of animals and plants.

In numbers, the Library of Congress doubtless leads the collections of the country. Its vast size can not be appreciated until it is arranged in the new building soon to be provided for it. It is reported to contain over 675,000 books, and perhaps 200,000

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Smithsonian Institution, Washington, D. C.

pamphlets. The Library Journal not long ago gave a list of forty-seven libraries in the United States, each of which contains more than 50,000 volumes, making an aggregate of 5,000,000 volumes. Eight of these have over 150,000 volumes each, and they may thus be grouped in the order of their magnitude: the Congressional, Boston Public, Harvard, Astor, Mercantile of New York, Mercantile of Philadelphia, Athenæum of Boston, and the Library Company of Philadelphia. The cities of Boston, New York, Philadelphia, and Washington are numerically foremost in their library resources.

Museums upon a generous scale are of recent growth in this country, as a few familiar facts will show. Yalensians remember the ofttold story, that when Silliman was appointed a professor at New Haven, early in this century, he took with him to Philadelphia, to be named, all the minerals of Yale College in a candle-box. This was the nucleus of the superb collections now included in the Peabody Museum of Yale University, so wonderfully enlarged in recent years. Although many important collections belonged to the General Government, yet the National Museum at Washington was not organized until 1876, and may be regarded as one of the fruits of the Philadelphia Centennial Exhibition, and as one of the many contributions to American science of the late Professor Baird. The Army Medical and Surgical Museum is a result of the civil war. To the inspiration, generosity, and labor of Agassiz, father and son, the Museum of Comparative Zoölogy in Cambridge owes its origin and development. Most of the higher institutions, like Cornell, Amherst, Princeton, and others, and nearly all large cities, have collections in one or more departments of natural history, generally the offspring of the last few decades.

No American has studied this subject so thoroughly and in so many aspects as Dr. Goode, of the National Museum in Washington; and from his various reports and addresses it is easy to deduce the history as well as the philosophy of these collections. The boundary line between the library and the museum, he says, is neither straight nor plain. The former is a place for books; the latter for objects of every kind, books not excepted. The library is most useful to the educated; the museum to the educated and uneducated alike. There can be no doubt that every one of the three hundred thousand persons who visit every year the National Museum carries away some lessons. But the value of that great storehouse is not to be measured by the pleasure or

the instruction it conveys to a casual visitor. It is a place for investigation as well as for transient impressions.

In accordance with this principle every great museum should be formed upon a definite plan for definite purposes; otherwise it will be a confused mass of heterogeneous materials, like the virtuoso's collections described by Hawthorne, or like Barnum's shows. For academic instruction, small museums made up of typical specimens are important, if not indispensable; but the great museums have wider scope. Their directors endeavor to bring together all the varieties of a certain class of objects—let us say of mammals, birds, fishes, shells, insects, woods, plants, rocks, crystals, or meteorites—so that the student may command a conspectus of an entire realm. The eye thus perceives the distinctive characteristics of orders and genera. The laws of structure and of function are readily seen. Moreover, the student may verify the descriptions that have been printed by other observers. He may confirm or reject by his own study that which is recorded. Sometimes the object of a museum is to secure, store away, and preserve from injurious treatment objects which are rare or unique. The resources of a given State or region may be the principal exhibit. Thus, in Albany the specimens collected in the survey of the natural history of the State of New York are carefully treasured; so at Berkeley may be found those which were brought together by the Geological Survey of California. The Peabody Museum, of Yale University, is distinguished for its collections of minerals, for the remarkable series of fossils found in the West by Prof. Marsh (including remains of the fossil horse and birds having teeth), and for its meteorites. In Harvard University there are several museums: one of comparative zoölogy, which includes systematic collections of the various orders of the animal kingdom, the fauna of continental regions, quaternary and tertiary fossils; another, of American archæology and ethnology; a third, of mineralogy; and a fourth, of objects illustrating the history and arts of the ancient Semitic peoples. Harvard has a fifth collection—almost if not quite unique—a set of models, in glass, of plants and parts of flowers, prepared for the Botanic Garden by the Blaschkas, of Dresden. This collection is only begun, as these extraordinary artists have engaged to give all their time for ten years to the making of this beautiful series, and are expected to send to Cambridge one hundred and twenty models annually. The American Museum of Natural History in Central Park, New York, is a noteworthy example of a museum

intended for the pleasure and instruction of the people while the interests of scientific workers are also promoted. Its illustrations of forestry, including the woods, the birds, and the insects, are remarkably beautiful and instructive. Boston has its Museum of Natural History, Philadelphia its Lyceum, and other cities collections more or less valuable.

The growth of particular arts and sciences and the development of ideas which underlie inventions and the improvement of instruments, are illustrated by such collections as those of the Patent Office and of the Agricultural Department in Washington, and of the Franklin Institute in Philadelphia. The various forms in which religious and social institutions find their outward expression are shown, for example, in Harvard and in the University of Pennsylvania.

For scientific purposes that collection is best which is made upon a definite plan commensurate with the means at command. It should exhibit as completely as possible all that belongs to a certain order or kingdom.

It is becoming more and more common to recognize two distinct classes of visitors, and consequently two distinct methods of arrangement are required. The first of these aims is to awaken, instruct, and give pleasure to the ordinary observers, for whose benefit Dr. Goode has humorously formulated this precept: "An efficient educational museum may be described as a collection of instructive labels, each illustrated by a well-selected specimen." The second is, to maintain (as he has also said) large collections which are not available for public exhibition, but are of inestimable value in the studies of a limited number of specialists.

In well-organized zoölogical and botanical gardens and aquaria living plants and animals may be seen as nearly as possible in their natural environment. Among such establishments the Botanic Garden at Cambridge, with its adjacent library, herbarium, and working-rooms, has long held the foremost place. Seven acres of land are devoted to the institution, and more than five thousand species of flowering plants are cultivated for educational and scientific purposes. The herbarium numbers more than two hundred thousand specimens, including the types described in the synoptical flora of North America. The Arnold Arboretum of Harvard University, in West Roxbury, Mass., was founded for the purpose of promoting scientific research in everything that pertains to trees, and it includes a museum of trees and shrubs which will grow in Massachusetts. The generosity of a private citizen

(Henry Shaw) has established in St. Louis a public garden where the science of botany is effectively promoted. Philadelphia has a noteworthy zoölogical garden; Washington, New York, San Francisco, Baltimore, and other cities have their beginnings, but there is nothing in this country which equals in scientific importance the Jardin des Plantes of Paris, or in attractiveness "the Zoo" of London; nothing that compares with the superb aquaria at Naples, Brighton, and other European cities. On the other hand, there is nothing in the Old World comparable with the great Yellowstone Park and with the Yosemite Valley in California, areas of large extent set apart by the General Government for the enjoyment and instruction of the people.

For the acquisition of knowledge instruments are quite as important as collections of books and specimens. The investigator not only needs to have at command examples of the animal, vegetable, and mineral products of every clime, but he needs also to enlarge and expand his ocular and manual powers. Minute observation and accurate measurement are the modern promoters of science. Hence it is that a very large number of contrivances have been made for enlarging man's vision. Indeed, it is hardly too strong a metaphor to say that the lens is the king of scientific instruments. The balance, likewise, is of great importance; and so is the accurate measuring-rod—a standard meter, yardstick, or pendulum. The prism and the diffraction grating are potent implements in the hands of well-trained investigators; but the lens is a greater potentate and commands a more extensive domain. Its scope reaches Uranus, and includes the movements of other celestial bodies unseen by ordinary vision; and it explores the realm of bacteria, whose very existence would have remained unobserved without its penetrating scrutiny.

The lens is not restricted to microscopic and telescopic apparatus; it is employed whenever clearness of vision is required. Some of its greatest conquests have been surgical, for with its aid the cavern of the eye, the depth of the nostril, throat, and ear, and the arcana of other cavities of the body are clearly revealed. In the domain of photography it plays an important part. To the astronomer, the physicist, the geodesist, the biologist, the geologist, the surgeon, and the physician, lenses are as essential as pens and paper to the man of letters. Indeed, if the story could be told in full of the skill expended in making glass, in giving to it the requisite curves, in modifying one lens by another, in devising

mechanical contrivances by which the lens may be governed and its discoveries recorded, and if to this the triumphs accomplished in many fields of research could be added, the story would be not only a striking illustration of combined ingenuity and of associated helpfulness, but it would be also an epitome of modern research.

In the perfection and adaptation of lenses our countrymen have been most efficient, but particularly in the manufacture of astronomical lenses, and in the requisite mounting of telescopes. The Clarks, of Cambridge, Mass., father and sons, have been the leaders in this field, and the record of their achievements makes a brilliant page in the annals of American science. Mr. Brashear has truly said that, if the story of what has been done through the instruments produced by the Clarks should be blotted out, "it would take from the pages of scientific history in the domain of astronomical research the grandest part of that record."

The mountings of a telescope, including innumerable devices for securing facility of motion, accuracy of position, and instantaneous records, have been greatly improved by American ingenuity. Sometimes to observers, sometimes to instrument-makers, these improvements are due. Such a triumph of science and art as the Lick telescope and its appurtenances is without an equal, at the present time, in any part of the world.

American microscopes of an excellent character have been made by Spencer, Tolles, Fitz, and others. The improvements they have introduced are partly ingenious contrivances for the easy and accurate adjustment of the lenses, but Spencer's work upon the lenses themselves deserves especial mention.

After the discovery of the Fraunhofer lines, and the invention of the spectroscope, which became, under Kirchhoff and Bunsen, an immediate and powerful auxiliary in physical and chemical researches, the study of light entered a new epoch. The prism was found to be an important ally to the lens, and the spectroscope became as indispensable to the astronomical observatory as to the chemical laboratory. Combinations of lenses greatly increased the efficiency of the simple instruments originally employed. But in astronomical service the prism was soon surpassed by the interference or diffraction gratings, which are chiefly due to American ingenuity and learning. These gratings are plates of metal or of glass, ruled with fine parallel lines, many thousands to the inch. When properly mounted they diffract the rays of light so that its constituent elements may be revealed.

It is now thirty years since Mr. Lewis M. Rutherfurd, of New

York, a gentleman of wealth, leisure, and of deep-seated interest in science, at the suggestion of Dr. Wolcott Gibbs, began to continue the observations of Fraunhofer on the spectra of the heavenly bodies. The imperfection of the spectroscope became clearly obvious to this investigator, who soon announced his intention to remodel and improve the instrument. This led to his employment of the diffraction gratings—plates of glass or metal ruled with extremely close parallel lines—which were soon recognized by physicists as a new and powerful agent in the analysis of light.

Some twenty years later Prof. Henry A. Rowland directed his attention to the subject, and began a series of improvements in the diffraction gratings which greatly increased their power, and have consequently extended their usefulness. Upon a subsequent page, the work accomplished by these instruments will be spoken of.

Bolometer is the name applied to an instrument invented by Prof. S. P. Langley for the purpose of measuring very minute quantities of radiant energy. It is extremely sensitive, more so than a very sensitive thermopile, and with it the inventor has carried on a series of important investigations with respect to the heat of the sun, and especially with respect to the distribution of heat in different parts of the solar spectrum, even in its invisible region. A part of his investigations were made at the summit of Mount Whitney, in California, where the atmosphere, at an elevation of nearly fifteen thousand feet, was most favorable for the research.

One of the very earliest scientific instruments devised in this country was the oxyhydrogen or compound blowpipe, the invention of Robert Hare, of Philadelphia, who was aided in its construction and improvement by Benjamin Silliman, of New Haven, during the period between 1802 and 1812. Dr. Hare's first work upon the blowpipe appeared when he was only twenty years old.

In the universities and colleges of this country science receives its full recognition. There has been no serious controversy between the advocates of the study of Nature and of books during the present generation, and no "war" has been waged between Science and Religion. Sometimes, indeed, the pulpit and the press have uttered apprehensions, but such cries have rarely been heard in academic circles, and nowadays are seldom heard anywhere. The day appears to be near at hand when Science will be openly declared to be the handmaid and not the enemy of Religion.

Institutions of learning vie with one another in the maintenance of observatories and laboratories. They strive to acquire

by purchase, by collection, and by exchanges the specimens requisite for study. Better still, they secure the services of able men as investigators and teachers. In many places the teachers of science are more numerous than those of letters.

But in addition to all that is done in colleges strictly so called, another class of schools renders great service in promoting the applications of science and in fitting young men to be leaders in various pursuits that are usually called "practical." The pioneer in this group of institutions was the Rensselaer at Troy. It is almost half a century since Abbott Lawrence gave a new impulse to technical studies by his gifts to Harvard. The Sheffield School soon acquired great influence at New Haven. The army and the navy have had their technical training places at West Point and Annapolis, and more special opportunities for higher instruction and research in the arts of war have been provided by the Government in the stations established at Newport, Willett's Point, and Fortress Monroe.

It is just thirty years since a remarkable impulse was given to scientific education by the passage of a bill in Congress under the leadership of Senator Morrill, of Vermont, which gave to every State a certain portion of the public lands, the proceeds to be devoted to the maintenance of a scientific college. The bill is commonly called the Agricultural College Bill (though that was not its exact title), but in fact its provisions were so liberal that all the applications of science might be promoted in the institutions that enjoyed its benefits. Gradually the schools thus endowed have become a most important factor in scientific education. At Ithaca a great university has grown up. At New Haven old Yale has found at its side a vigorous ally in the new Sheffield. In the Western States the Morrill Act has gone often, but not always, to the enlargement of the State university, as in Minnesota, Wisconsin, and California. The South, because of the war, was not so quick as the North to secure the benefits of the congressional grant, but scientific schools are now being developed in that part of the country. A portion of the funds go to institutions for the blacks—for example, at Hampton, Va.

Notwithstanding some infelicities due chiefly to inexperience, the success of these establishments has been so great that Congress has provided for their further endowment, and has gone a step onward by giving the means requisite for maintaining in every State a station for agricultural experiments. These new institutions are showing great vigor, and are likely to throw much light

upon questions of soil, climate, fertilization, the improvement of dairies, the diseases of plants and animals, and other subjects where practice must be governed by knowledge. An investigation of soil-physics now going forward in Maryland is full of promise.

In elementary education the study of Nature has not yet secured its full recognition, partly because of the great difficulty in obtaining teachers who are qualified to interest the young in the plants, the trees, the birds, the insects, and the rocks to be found in the open air. The introduction of kindergartens and of liberal schools for the training of teachers, like the college for the training of teachers in University Place, New York, the Drexel Institute in Philadelphia, the Pratt Institute in Brooklyn, and the Armour Institute in Chicago, will soon produce a change.

In European states, academies, royal societies, and other associations of learned men are of great importance in the encouragement of scientific researches. They have been less effective in this country, having failed to secure the governmental support elsewhere bestowed. Nevertheless, their influence is not to be overlooked. The American Philosophical Society of Philadelphia, which numbered among its earliest active members Franklin and Rittenhouse; the American Academy of Arts and Sciences, which has had among its members a long succession of original workers; and the Connecticut Academy of Arts and Sciences, have the dignity of age. But the criticism which was uttered by Prof. Newcomb in 1876 is still true: "There has been no increase in the means or the publication of our learned societies at all proportionate to the increase in the material facilities for research. How can we account for this? . . . In this country we are aware of but a single State which has thus taken upon itself the patronage of science, and it will probably surprise many readers to hear that this is Wisconsin. It is not impossible that there are other States which have done the same thing, but, if so, we have not become aware of the fact. Deprived of State aid, our societies must depend upon their limited resources for the means of publication. The meagerness of these resources is in most cases extremely surprising."

The National Academy of Sciences, incorporated by Congress during the civil war, includes among its members many of the most distinguished investigators of the country. Its publications are important. A recent summary of the membership shows that a remarkably large proportion reside upon the Atlantic seaboard. This is a significant fact, apparently indicating that the older in-

Agassiz Museum, Cambridge.

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stitutions, which have greater facilities for the encouragement of science, are the most favorable to original investigation.

The tendency is more and more toward the establishment of societies for the promotion of special sciences, such as chemistry, mathematics, climatology, physiology, natural history, etc. In the medical profession specialization has gone so far that a union of the various societies, under the name of a congress, has been established, and it is not unlikely that a similar congress of scientific associations will be found useful. Meanwhile, the American Association for the Advancement of Science, the younger sister of the British Association, having a strong resemblance to its elder relative, continues to hold the large assemblies which for about half a century have been one of the features of intellectual life in this country. These meetings are open to the public; membership is not restricted to investigators; different places of assembly are chosen annually; and a vast amount of influence has been exerted by their agency in favor of the liberal encouragement of scientific activity. Almost every city, almost every college, maintains one or more associations for the reading of papers and the promotion of inquiry.

The Smithsonian Institution holds a unique position among the scientific foundations of the country. A private benefaction, established in the capital, fostered by the Government, and administered by men of enlightened and catholic spirit, has become in the last half century a powerful auxiliary to almost every department of research. Its policy has been to undertake important work not otherwise supported. Its series of publications, quarto and octavo, has been maintained on the principle that knowledge was to be advanced. All its operations have been conducted upon what may be termed the co-operative plan. Thus, after it became apparent that the Library of Congress was to be the great national library, the Smithsonian modified and restricted its library plans. For a while, under Prof. Henry, much attention was given to meteorology; but when the Government established its weather service the Smithsonian yielded this field. Its museum of natural history became the nucleus of the great National Museum, which continues to have its fostering support. There is still ample work remaining for the Smithsonian funds, which are likely in the future, as in the past, to be administered on the plan of co-operation with other scientific agencies and seminaries, at home and abroad, which are seeking the promotion of knowledge.

Since 1876 there has been a remarkable development of the

university idea, as distinct from the college idea. Among other things the university idea includes the encouragement of research in every sphere of human thought. Old institutions, like Yale, Harvard, Columbia, Princeton, and the University of Pennsylvania, have expanded their work. New institutions have been liberally endowed by men of wealth like Cornell, Johns Hopkins, Clark, Tulane, Case, Stanford, and Rockefeller. The State foundations, especially in the Northwest, have been greatly enlarged. At last the chief religious bodies have taken up the university idea. The Roman Catholics have made a liberal provision for theological and philosophical studies in Washington. The Methodists have secured a site in the same city, and are seeking for the requisite funds. The new university at Chicago, by its organic act, is to be under the control of the Baptists. It is difficult to foretell what will be the effect of these religious or ecclesiastical scientific foundations. There is obviously some danger. It is possible that a multitude of ambitious and feebly endowed institutions will occupy the places which ought to be held by a few strong foundations. The plea of Andrew D. White for the concentration of money and men upon a small number of vigorous universities was most timely. It is a pity that such forcible words as those which he has uttered do not produce more effect.

When the question is asked, whether young men of exceptional ability are encouraged to enter upon the career of investigators, the answer is not by any means simple. Not only in professorial chairs, but also in a very large number of places under the National and State Governments, scholars of talent and of original power are in constant demand. Their required duties are by no means exhausting; often their daily occupations are closely connected with the ascertainment of the facts in some branch of science. In these two groups, the governmental and the professorial, most of the scientific men of this country have been enrolled. In early days they appeared in the profession of medicine. Occasionally a man of leisure, drawing no salary, rendering no account of his hours, has done an excellent piece of work. One conspicuous example may be named—a distinguished astronomical physicist, long resident in New York.* But, as a rule, the best investigators have been those who have had a large amount of responsibility combined with a considerable amount of leisure.

* Mr. L. M. Rutherfurd.

The inadequate salaries hitherto given have no doubt exerted an obscure but potent influence in deterring from academic callings and from Government service many young men whose talents would have fitted them to excel in scientific work. The large industrial enterprises of the country have absorbed numbers of those who might have been qualified for other work. But the increased resources of the higher institutions will soon exert their influence. Colleges have hitherto struggled with the adverse influences of poverty; they are now to show whether they are to be injured by the fostering influences of wealth. Aside from pecuniary returns, other rewards, which can not be measured by dollars and cents, favor the development of scientific men. Recognition—"the praise of men who themselves are praised"—is a powerful stimulus; and yet in this country, as elsewhere, recognition is inadequately, often harmfully, bestowed. The indiscriminate award of academic degrees, even those called honorary; careless methods of election to learned societies; easy notoriety acquired by the agency of newspaper paragraphs; demands for popular addresses and for readable articles—are influences which awaken among young scholars an appetite for temporary and provincial reputation, and so efface the desire for that enduring distinction which depends exclusively on good work, submitted to the judgment not of warm-hearted friends but of cold-hearted critics. Doubtless, as the country grows older and its workers become more and more conscious that there is no such thing as local science, and that each great branch of knowledge goes forward by the associated efforts of innumerable workers in every part of the world, the number of able investigators will increase, and their work will be more prolific and more important.

One of the most useful agencies for the encouragement of young men to enter upon the work of scientific investigation has been the establishment of university fellowships, which may be held for limited terms by those who wish to concentrate their energy upon study after receiving their collegiate training, and before proceeding to the responsibilities of official station. It is estimated that one hundred such fellowships, yielding from three hundred to five hundred dollars each, have been established within the last twenty-five years in different colleges.

Many departments of the Government afford excellent opportunities for the development of talent. In the Coast and Geodetic Survey, the Geological Survey, the National Museum, and

the United States Fish Commission much important investigation under the direction of competent chiefs is performed by those whose education and tastes have especially qualified them for such scientific labors.

Everywhere men of science are held in honor. Their opinions are respected, their co-operation is sought, their counsels are followed. There are indications that, as civilization advances and the rule of the political machine is weakened, municipalities and States will secure the services of scientific advisers to whom will be referred all important questions pertaining to the health and prosperity of municipal communities. Indeed, in many communities this custom is already initiated.

Science that is not made public hardly deserves to be considered. The early communication to other minds of the results of an investigation is therefore recognized as an ethical obligation. Temporary reticence until conclusions are reached is often requisite; but it is one of the glories of science that its discoveries belong to no country, no class, no individual; they belong to the world. Ample means for the prompt publication of scientific researches should therefore be provided. In this respect the United States has been behind other nations. It is true that within the last ten or fifteen years such facilities have increased, and now there are journals enough for the insertion of brief memoirs and reports of progress. Funds are still needed for the printing of extended memoirs, particularly those that require to be illustrated with plates.

Except the memoirs of learned societies to which reference has been made, the nineteenth century was well advanced before a purely scientific journal, supported by original American contributions, was established by Dr. Bruce. Only four numbers appeared. The American Journal of Science and Arts was founded by Prof. Silliman, of Yale College, in 1819, and from then until now its publication has been uninterrupted. Three generations have been engaged in its editorial management—father, son, son-in-law, and grandson. The long series of volumes is regarded in every great library as a history of American science. No small part of the distinction of the journal is due to Prof. James D. Dana, one of the editors for more than forty years, and a constant contributor. Special journals devoted to original papers in mathematics, chemistry, physics, astronomy, biology, morphology, psychology, and astro-physics are now in process of publication.

The Government prints a great many memoirs in addition to those which bear the imprint of the Smithsonian Institution. The reports of the National Academy, National Museum, Naval Observatory, United States Coast and Geodetic Survey, Corps of Engineers, Ordnance and Hydrographic Offices, Geological Survey, and Bureau of Ethnology are among the most important. Almost every State has done something for scientific publication. The Natural History of the State of New York and the Reports of the Geological Surveys of California and Pennsylvania are among the most thorough and extensive series. The reports on the Natural History of Massachusetts are excellent.

In general the American publishers have not inclined to assume the risk of printing costly monographs. Text-books, manuals, the records of exploration and discovery have appeared in great numbers, but extended treatises with many plates rarely see the light without the subvention of a government or an association.

Universities and colleges are beginning to use a part of their funds in publication. At Harvard, for example, the Memoirs of the Museum of Comparative Zoölogy and the Annals of the Astronomical Observatory are excellent illustrations of the services which a great foundation can render to science. Those which are published by the Johns Hopkins University are also noteworthy.

All the agencies that have now been enumerated must sooner or later be brought to the test of results. They are of but little value if they only gratify a desire for acquisition or for notoriety, if they only appeal to the applause of the *chauvinists*, who exalt with undue enthusiasm the patriotic standard, or praise exclusively the products of their native land. As science is the interpretation of Nature, it can have no local restrictions, no national supremacy, no provincial court of equity or appeal. Every new discovery must be brought into relations with accumulated knowledge; every fact will be found related to another fact; every object must be compared with other objects; every law must be recognized as a part of the universal code which will never be completely revealed before the finite yields to the infinite, the mortal to immortality.

We may with propriety speak of the scientific men of America, or of American institutions for the advancement of science, or of the progress of science in the United States; but to speak of American science is to speak of that which does not exist. The

most that the philosophers and naturalists of any country can do is to build upon the foundations which others have laid, to improve their instruments, to extend their researches, to verify or disprove or enlarge or amend the theses, the laws, the doctrines that have been already enunciated. At rare intervals a genius appears, like Newton, Linnæus, Cuvier, Darwin, Abel; but science is carried forward by the talents, industry, patience, and persistence of a large number of co-workers, each of whom makes a modest contribution to the great structure of human knowledge.

To this general survey of the condition of science in America some illustrations of the progress making in different departments of investigation will now be added. The reader, however, must bear in mind that a full survey of this vast field is impossible. No agencies exist for concentrating in any repository or in any university or in any library the record of the innumerable results of the intellectual activity of our countrymen. Many most important subjects will not admit of popular discussion. They are intelligible only to minds that are trained in those special subjects. The most profound investigations, indeed, are rarely those that are most striking. Those which arrest universal attention may be less significant than others that escape the notice of the public. For example, it is only a mathematician who can understand what is meant by the modern theory of functions. It will convey no meaning to an ordinary reader to exhibit in mathematical phraseology the way in which the writings of Abel are bearing fruit in these days. Technical logic is almost as difficult as pure mathematics. Modern chemistry can be expressed only in the nomenclature and the symbolism of modern investigators. The science of physics in its various branches is written in the language of the calculus. Indeed, the more advanced knowledge is, the more requisite are exact terms, precise phrases, unmistakable symbols. For these reasons, as well as because of the limitations of the space at command, general statements and occasional illustrations of scientific progress alone can be given here.

Without any knowledge of the facts, we should expect that among the earliest subjects to attract the attention of the original colonists of this country would be the lay of the land, its ranges of hills, its water courses, its rocks and minerals, its climate, and the unfamiliar beasts, birds, and fishes which were noticed in different parts of the country; and so it was. The older printed records of American science, indeed, include many reports upon what

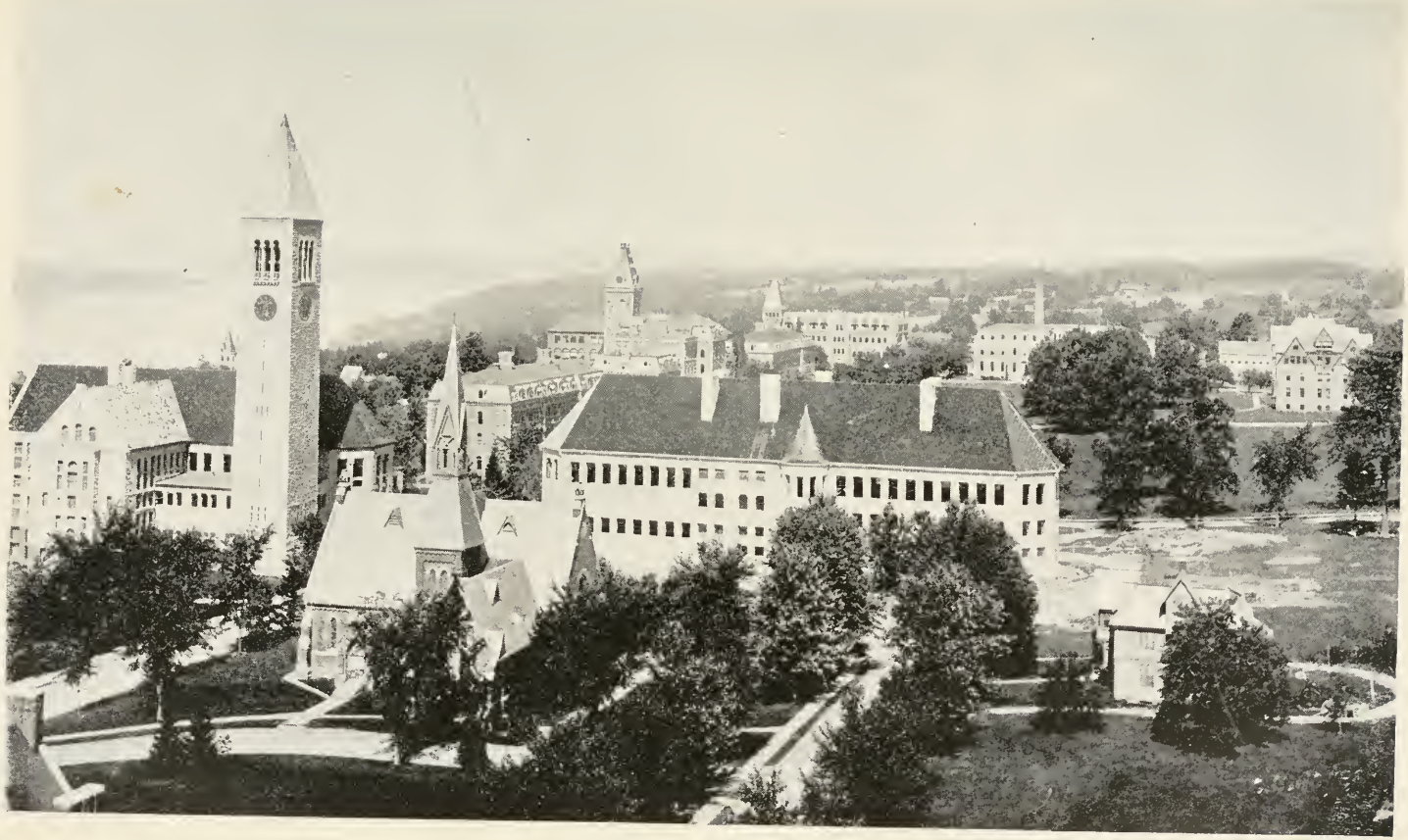
the intelligent immigrants of the day discovered and observed; but such memoirs are the work of pioneers, governed chiefly by the stern necessities of that wilderness to which they had been led by religious, political, and financial reasons, and not by the love of knowledge. The modern spirit of systematic research had not then descended upon this world, so that, despite the opportunities of the colonists, their contributions to science were neither numerous nor important. John Josselyn published in 1672 a book entitled New England Rarities Discovered, which has been described as "a curious medley of science and nonsense"; and in the middle of the seventeenth century John Winthrop, Governor of Connecticut, sent occasional memoirs on the natural history of this country to the Royal Society of London, of which he was a member, and of which he is reputed to have been one of the founders. Toward the middle of the next century his kinsman, Prof. John Winthrop, of Harvard, showed great ability in the study of mathematics and physics. He made successive contributions to the science of earthquakes; he observed the transit of Mercury in 1741 and 1743, and in 1761 he led an important expedition to Newfoundland for observation of the transit of Venus. This astronomical occurrence was again observed in 1769 by David Rittenhouse, of Philadelphia, likewise a man of mark, who was for many years a leader of scientific work in the Middle States. But, on the whole, the most illustrious names in our scientific annals prior to 1800 are those of Benjamin Franklin and Benjamin Thompson, better known as Count Rumford. They have won renown which is far more than provincial, the one by his study of electricity and of the Gulf Stream, the other by his interest in the laws of light and heat.

The outlines of the land included in the United States were not known at the beginning of this century; even now there is a vast amount of measurement to be made before such maps can be issued for the country at large as England, France, Switzerland, and most European states possess. The nineteenth century was well under way when Lewis and Clark made their famous expedition into the Northwest and discovered the sources of the Columbia River. From that day to this the national Government, with more or less liberality, has provided for surveys of the vast area between the Atlantic and the Pacific Oceans. The aggregate outlays for such surveys have been large, but none too large if compared with the vastness of the field and the supreme importance of accurate maps. The citizen of the United States, far from

regretting the expenses thus incurred, should wish for greater liberality, and a steadier, less spasmodic prosecution of topographical research. The two agencies by which Congress now provides for the continuance of geographical work are the United States Coast and Geodetic Survey and the United States Geological Survey. With these civil organizations the work of the army engineers, especially in the survey of the rivers and Great Lakes, is always to be associated.

The result of these combined investigations has given to the world an accurate map of all the water boundaries of the United States, of the submarine coast lines, of the Gulf Stream, of the principal continental water courses, and of the Great Lakes. The mountainous regions of the country have not yet been so thoroughly surveyed, for the difficulties are obviously much greater; but there are certain regions, both in the Appalachians and in the Cordilleras of the West, which have been well mapped. In some cases, as in California and in Massachusetts, for example, the aid of separate States has been advantageously enlisted. Now and then an individual like Arnold Guyot, or an association like the Appalachian Club, makes important contributions to local geography. Yet it must be admitted that a great deal more must be accomplished before the country will have such a map as the Government of France, for example, has produced.

The geographical studies of Americans have not been restricted to their own territory. Religious motives have sent educated missionaries to distant parts of the globe, and their letters and books from India, China, Syria, Africa, and the islands of the sea, have added not a little to the knowledge of the world. The researches of Edward Robinson, for example, and those of his learned colleague, Eli Smith, mark the beginnings of modern exploration in the Holy Land. In a few rare instances the Government has favored distant and extra-territorial exploration. Captain Wilkes (afterward Admiral) led an expedition around the globe in the early Forties, and the reports which his staff of learned associates prepared on the philology, the botany, the zoölogy, and the geology of the Pacific took rank at once with those of the great exploring expeditions which the British and French Governments had previously encouraged. At a later day Central and South America attracted attention, and the survey of the La Plata, the astronomical expedition to Chili, and many surveys of the Isthmus of Darien, with its adjacent territory, received the favor of Congress. Important investigations of the oceanic depths were first



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made on the Atlantic, and subsequently on the Pacific Ocean. The Gulf Stream has been thoroughly studied. Arctic exploration has been a favorite field of American research. The spirit of chivalry led to an expedition under Dr. Kane for the discovery of Sir John Franklin's fate, and from that time on, the desire to increase knowledge and the readiness to rescue those who were lost, have alternately quickened the enthusiasm of brave explorers and have called forth the support of public and private purses. The ice pole is still a region of mystery, but the Americans have probably penetrated farther than any other navigators into its well-fortified precincts. It is doubtful whether Stanley should be called an American, and whether it would here be right to dwell upon his wonderful journeys through the dark continent, pleasant as it is to remember his ties to the United States. No doubt whatever rests upon the nationality of Commodore Perry's expedition to Japan, which opened to the outside world the wonders of that hidden empire, and prepared the way for its entry into the brotherhood of states. American students have shown ingenuity in devising instruments for deep-sea sounding, and patience as well as skill in prosecuting such work. Indeed, it is largely due to the American hydrographers, both on the Atlantic and Pacific Oceans, that so much progress has been made of late years in submarine topography, and that we are approximating accurate delineations of the bed of the sea.

Meteorology, a branch of physics, is so closely related to geography that it may be mentioned here. The irregular records of the temperature which were made in many places prior to the establishment of the Smithsonian Institution gave place to systematic and widespread observations, under the guidance of Joseph Henry when he became secretary of that great establishment in the capital. The data that he brought together were discussed by many philosophers. The importance of the study of climate was presently recognized by Congress, and provision was made for a Signal Service or Weather Bureau, first in the Department of War, and then of Agriculture. To its efficiency the country owes the daily forecast which appears in the newspapers, maps, and tables which exhibit the climatic conditions of the United States, and many scientific memoirs. There is hardly any subject, possibly excepting religion and politics, in which there is such widespread interest as in the weather, and the large appropriations which are made for this branch of the public service are abundantly justified by the benefits conferred, not only

upon those who go to sea, or who are engaged in agriculture, but upon every inhabitant of the land, for health, comfort, and property are all affected by climate.

Geology is the child of Geography. Wherever the explorer goes he is certain to raise questions respecting the origin of the mountains and hills, valleys, table-lands, prairies, and plains. He is constantly asking why these things are as they are. During the last half century, which has witnessed the series of explorations just enumerated, geology has made most rapid advances. The increased facilities of travel have made it easier for well-trained men to visit distant regions, and thus to make in the field those comparisons which are indispensable for an understanding of the phenomena of any region. Scientific philosophy has interpreted the facts as they have been collected. Aside from heaven-born curiosity, which has inspired the ablest investigators, the earth-born love of plenty, eager for useful and for precious metals, *auri sacra fames*, has supplied the means for investigations upon a gigantic scale. Very many of the States of the Union—first in order of age, North Carolina—have maintained their local geological surveys. It is hardly fair to discriminate among their reports, but it will be generally admitted that New York, Pennsylvania, California, and New Jersey are especially valuable, partly because of the interesting problems connected with the structure of these States, and partly because of the ability of the geologists who were early enlisted in their interpretation. Various writers have printed systematic treatises on American geology, combining the facts collected by the multitude of local explorers and observers; occasionally, thinkers of rare ability have publicly discussed the physical and chemical forces which have altered the constituents of rocks, and other profound investigations of this subject are understood to be in progress. Constantly the geologists of Europe have turned to the North American continent for light upon many points hitherto obscure.

Among the revelations of American geology, the remains of extinct fauna found in the Rocky Mountains are most remarkable, and they interest the biologists as much as they do the geologists. The great collections in Washington and elsewhere contain some of these marvelous examples of ancient life. The bones of birds with teeth, and of horses with two, three, and four digits, are among the most significant. They are striking indications of the development of existing forms from those which long ago disappeared, and are now constantly described or referred to in discussions re-

specting the origin of species. Charles Darwin wrote to Prof. Marsh, in 1880, that his work "on these old birds, and on the many fossil animals of North America, has afforded the best support to the theory of evolution which has appeared within the last twenty years."

In some other special departments of geology Americans have achieved high reputation. For example, the study of fossil plants and the study of fossil insects should especially be named. The formation of coral reefs has occupied the attention of the Nestor of American geologists, since his voyage around the world under Wilkes, and quite recently he has revisited the Hawaiian Islands in order to re-examine the phenomena of volcanic action. Nor is he the only living American who has worked efficiently in this field of inquiry.

The minerals of the United States have been carefully collected, studied, and described, and a description of each new species or variety that is brought to light is sure to be published. Dana's Mineralogy, re-edited from time to time by the author and his younger colleagues, is among the standard works acknowledged as masterly by the mineralogists of every land. In recent years the use of the microscope has made a great addition to man's knowledge of the structure of rocks, hitherto acquired by chemical analysis, the measurement of crystals, and the examination of physical properties. Thin sections of rocks, placed under the lens, reveal many secrets previously unknown, and the younger school of mineralogists are equipping themselves for this kind of investigation.

From the colonial days attention has been given to the study of American plants. Early in this century Michaux and Nuttall described the forest trees of the country, and other botanists collected the flora of limited areas, and printed their descriptions of newly discovered plants. The preparation of a systematic flora for the United States was undertaken by two botanists, Dr. John Torrey and Dr. Asa Gray. The work could not have fallen into more capable hands. But the senior, as years went on, yielded the chief responsibility to his junior colleague, and he in turn gave up this work to younger associates. The vast additions that were made to the territory of the United States on its southern borders, and in the extreme Northwest by the purchase of Alaska, extended the original fields; while the opening of railroads through the great upheaval of the Rockies and the Sierras brought to light multitudes of plants before unknown. Most if

not all the collections made by the explorers in the West were submitted to Dr. Gray, and the herbarium under his charge in Harvard University thus became the chief repository of American plants. But the work of American botanists has not been restricted to the acquisition of specimens and the description of species. Physiological and morphological studies have been likewise carried on, and some of the younger botanists have won distinction in this field. The trees of the Eastern States have been carefully studied for their economic and ornamental value, and Sargent's masterly survey of the forest trees of the country is now in course of publication.

The study of animal life, or zoölogy, has gone through stages not unlike the study of plants and minerals. It was obviously the first task of the observers of this country to collect and describe the various species of beasts, birds, fishes, reptiles, mollusks, and insects; to seek out the laws of their geographical distribution, and to ascertain their kinships. This work has been well done, as the great museums already mentioned will perpetually testify. The literature of American zoölogy is extensive, and much of it is illustrated by costly plates, like the monumental volumes of Audubon, the publications of the Pacific Railroad and other Western exploring expeditions, and the reports on the crustacea and the zoöphytes of the Pacific. Now and then some animal, like the seal or the sea-lion, has attracted the particular attention of an enthusiastic observer, or some variety of game has called forth a careful study, of no slight value to science.

The coming to this country, in the middle of the century, of Prof. Louis Agassiz, the Swiss naturalist, who had already won European distinction by his researches respecting fossil fishes, exerted a strong influence upon the young naturalists of America. He was also skillful in awakening the respect and the liberality of those who in public or in private commanded large pecuniary resources which might be directed toward the new education. From the foundation of the Lawrence Scientific School in Cambridge, in which a chair was provided for him, the development of scientific as distinct from technical studies may be dated. Though the influence of Agassiz was strongest in zoölogy, the laboratory instructions, the public lectures, the memoirs, the collections, and the travels of this able and enthusiastic teacher attracted universal attention to the value of science as a factor in civilization, and led the way to investigations and publications by which many younger men have won distinction.

Among the projects in which Agassiz was interested was the establishment of a summer school at Penikese, on the southern shore of New England, where the inexhaustible fauna of the sea might be studied by young naturalists. The life of this school was short, but its influence endured. Other summer schools were afterward organized for the instruction of young teachers, and laboratories for biological and geological investigations have been maintained at Harvard University and elsewhere. The younger Agassiz built a private laboratory near Newport. The United States Fish Commission, after a trial of other sites, adopted Woods Holl, on Buzzard's Bay, as its permanent home, and there the national Government erected large buildings well equipped for research. Although economic questions respecting fisheries are most prominent in this marine station—that is to say, the study of conditions favorable and unfavorable to one of the chief food products of the United States—yet the enlightened management of the directors, favored by congressional grants, has encouraged scientific investigation, the basis of all exact knowledge. At Woods Holl, also, private enterprise has established and maintained a summer school. For more than ten years the Johns Hopkins University has maintained a marine laboratory, sending a company of well-trained biologists to such points on the Southern seaboard of the Atlantic and to such points in the West Indies as from time to time the chief of the party has selected. Among the obvious practical results of this purely scientific foundation, the light thrown upon the embryology and the life habits of the Chesapeake oyster should not pass unmentioned. The University of California has recently established upon the Pacific its biological station.

In recent years, since the days of Darwin, the close relationship of animal and vegetable life, and the descent of actual animals and plants from those of remote periods, have occupied so much attention that the phrase biological science, or biology, has come into widespread use. When the first American biological laboratory was established, in Baltimore, not yet twenty years ago, it was regarded with disfavor, not to say hostility, and it was no easy task to make its purposes and its methods of investigation clear to the ordinary intelligence. But true science takes no backward steps. Gradually the importance of studying the functions of living animals and plants, and the various changes which their forms undergo in the course of their life history, has been recognized in most of the well-developed universities of this

country. Biological laboratories have in consequence become almost as common as laboratories of chemistry and physics, though not all of them have adequate means for investigation. Much of the work which in former days would have been regarded as natural history is now called biology. The biological sciences—the physiology and morphology of animals and plants—have employed new instruments and new methods of research, and have led to most important results. If he would become a successful physician, naturalist, or even psychologist, the young aspirant must henceforward acquire a fundamental knowledge of these subjects.

From studying, with the powerful aid of the microscope, minute forms of germinal life, a still more special department of research has been developed. The bacteria, extremely small organisms which dwell in the air, the water, and the soil, some of them harmless, some of them helpful, some of them mortal enemies of man, have engaged during the last twenty years the attention of able investigators in every part of Christendom, and a new branch of science—bacteriology—has come into wonderful activity. The names of Koch and Pasteur are everywhere known. The relation of microscopic beings to the life, in sickness and in health, of plants and animals, and especially of the human species, gives transcendent importance to their inquiries. Modern precautions for the prevention of diseases, like cholera and certain fevers, are based upon what is known of the growth of noxious germs; and the marvelous successes which attend the operations of modern surgery are due in no small degree to antiseptic precautions directed to the destruction of bacteria. Upon this field our countrymen have entered with success.

Among other good services which the biological laboratories of the world have performed should be mentioned their influence upon the study of psychology. From time immemorial the subtle relations of mind and body, the hidden forces which we call ourselves, and the bodily organs by which we come into relations with visible and tangible realities, have been among the most attractive themes of philosophical inquiry. *Cogito ergo sum*—I think, and therefore I exist—has been the initial point, avowed or unavowed, of a great deal of modern speculation. But it is only in modern times that the minute anatomy of the nervous system has been carefully worked out, and the measurement of nervous activities made accurate. This new line of scientific activity takes the name of psycho-physics, and sometimes of the new or

experimental psychology. In Clark University, established at Worcester, special concentration upon this subject, and upon those closely allied to it, has been secured.

From man as a thinking and sentient being to man as a member of a family or race the transition is natural. The aboriginal inhabitants of the American continent have rightly engaged the attention of American ethnologists. Something has been done in this country to advance the science in its more comprehensive aspects. The Africans who dwell in the United States have not been, and are not likely to be, overlooked or forgotten. But it is the origin, the history, the customs, and the speech of the so-called North American Indians, of the collectors of shell heaps, of the primitive mound-builders, of the cliff dwellers, and of the architects of temples and religious monuments in Central America, which have chiefly been investigated. Not a few inquirers of great ability have visited and described the remains of ancient civilization, and others have endeavored to ascertain, arrange, and place on record the ideas that govern the still existing, fast disappearing, primitive and savage inhabitants of the far West. The languages of these unlettered people have been to some extent preserved from complete disappearance, but not near as much has been done in this direction as would have been desirable. Much has been learned in regard to primitive religion and social customs. The measurement of skulls, in order to ascertain the physical relationships of different tribes, has not been neglected. Portraiture has contributed its records, and the day is to come when all these varied acquisitions will be thoroughly discussed by some philosophical writer, and another chapter will be added to the record of human progress from primitive to civilized life. In the Peabody Museum at Cambridge and in the Bureau of Ethnology at Washington these investigations are especially promoted.

We have now looked at the progress of geographical and geological science, and at the study which has been directed to the minerals, the plants, the animals, and the human beings found within the territory of the United States. It is time to turn our attention to other branches of scientific inquiry which have no relation, or only a slight relation, to the country in which they are developed.

Mathematics, rightly designated as "the queen of all sciences," first claims our attention. Contributions to pure mathematics have not been numerous in this country. With a few brilliant ex-

ceptions, the studies of those who are capable of pursuing these difficult and abstract lines of thought—which require, as a writer of great distinction has shown, the exercise of imagination as well as of verification—soon turn to astronomy, physics, engineering, and other branches where the mathematical laws are traced in their application to visible realities. The reason why this should be so it is not easy to discover. At one time it was thought that the lack of facilities for the publication of abstract memoirs, that can only interest a very limited circle of readers, might be the cause of such sterility ; but that reproach, if it be a reproach, disappeared many years ago, when Sylvester established an American journal, to which the foremost mathematicians of Europe have been the contributors of original papers. Nor has the inspiration of great teachers and thinkers been wanting. Doubtless the duty of drilling beginners has absorbed the attention of many professors of this science, while others have been drawn into pursuits which have yielded more immediate and obvious returns and have received much heartier recognition from the public. All this is now changing. The younger mathematicians are producing papers which show that American contributions to mathematical science will not in the future be as scanty as in the past. Already in the mathematics of astronomy Americans have taken the foremost rank, as the honors they have received in foreign academies abundantly testify. Dr. Nathaniel Bowditch, early in this century, by translating the great work of Laplace on Celestial Mechanics, when the number of English-speaking people who could read the French original was very limited, gave an impulse to these studies by which the young astronomers, indirectly or directly, have undoubtedly been influenced. But the day of original researches came afterward, and is continually growing brighter.

Mention has already been made of the work of the American astronomical observatories. The large sums that have been expended in their equipment are justified by their contributions to human knowledge. The series of celestial observations which have been made and published at Washington and Cambridge are due to the patient and prolonged labors of well-trained men. The additions to the ever-growing list of asteroids, especially by the astronomers of Ann Arbor and Hamilton College, have been numerous. Since the discovery of the planet Neptune by Adams and Leverrier, there has been no single event in the annals of astronomy quite so remarkable as the discovery by Asaph Hall, at the Naval Observatory in Washington, in 1877, of the two satellites of

Biological Hall, University of Pennsylvania, Philadelphia.

Sheffield Scientific School, Yale University.

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Mars,* until the announcement in September, 1892, that a fifth satellite of Jupiter had been seen by Barnard, at the Lick Observatory in California. It is a noteworthy coincidence that Italy was engaged in celebrating the departure of Columbus, when an astronomer, in the newest part of that new world which the Genoese navigator discovered, found in the skies a world whose existence had never been foretold or suspected. The preparation of a photographic map of the heavens, and the measurement of the light of the stars, are among the brilliant services of the Harvard Observatory. In other places the appearance of comets has been carefully watched for. At New Haven, for more than half a century, especially since the great meteoric shower of 1833, the phenomena of shooting stars have been successfully observed and the laws of their once mysterious appearance have been gradually revealed. To American astronomers is due the credit of first determining transatlantic longitudes by telegraph. Soon after the Atlantic cable was laid a series of connected measurements was made from the Ural Mountains to New Orleans. More than a thousand double stars were observed by Mr. Burnham at Chicago while still pursuing the calling of a stenographer. A satellite of Sirius was discovered by Clark, in Cambridge, in the position indicated by Safford.

Recently the Harvard Observatory has established what perhaps may be called its satellite, four thousand miles away, at a point somewhat more than eight thousand feet above the sea, near Arequipa, in Peru. This is done in accordance with Mr. Boyden's will providing for the establishment of an observatory at such an elevation as to be as free as possible from impediments due elsewhere to atmospheric influences. We are told that in the transparent sky of Arequipa, stars of the third magnitude may be seen, by the unaided eye, to set below the horizon, and with the thirteen-inch refractor the phases of Jupiter's satellites are readily observed. Prof. W. H. Pickering, who is in charge of the Boyden station, writes thus in respect to its advantages: "It has often been said that the chief obstruction at present to astronomical advance was our own atmosphere, but this obstruction has now been practically overcome, and what we see here depends not, as elsewhere, upon the condition of the air, but only upon the size and quality of the telescopes employed."

* This discovery was not an accident, but the result of careful observation for a definite purpose, by a trained astronomer, with a powerful lens, at a time when the planet was near to one of its two nearest approaches to the earth, occurring in this century.

The alliance of photography to astronomy has not only been fruitful in spectrum analysis, which will be presently spoken of, but in many other departments of research. Dr. J. W. Draper was one of the first, if not the very first, who made a photographic picture of the moon, and subsequently Rutherfurd, H. Draper, and the Lick astronomers have been even more successful in perfecting its image. But a wider range has been given to celestial photography at the Harvard Observatory. Nearly thirty thousand glass plates have been made, representing the entire sky from the north to the south pole, partly taken in Cambridge and partly in Peru. There is another collection of photographs of stellar spectra. These photographs show the condition of the sky from 1886 to the present time, and form the only collection of the kind that exists. The Kenwood Observatory of Chicago entered upon a field of inquiry practically untried—the application of photographic methods to the registration of all classes of solar phenomena. Daily series of photograph observations are now carried on, recording the spots, granulations, faculæ, and bright prominences of the sun.

An American astronomer, Dr. Gould, to whose work allusion has already been made, was called in 1868 by the Argentine Republic to organize its National Observatory. His great work in cataloguing and mapping the stars of the Southern heavens reflects its luster upon his native land.

As accurate measurements of immense distances lie at the basis of modern astronomy, it is of the first importance that the unit of celestial measurements should be known with the utmost possible accuracy. The distance of the sun from the earth is accepted as this unit, and some of the ablest minds have been engaged in its determination. The following paragraph from Miss Clerke's History of Astronomy in the Nineteenth Century is a clear statement of the significance of the problem:

"The question of the sun's distance arises naturally from the consideration of his temperature, since the intensity of the radiations emitted, as compared with those received and measured, depends upon it. But the knowledge of that distance has a value quite apart from its connection with solar physics. The semidiameter of the earth's orbit is our standard measure for the universe. It is the great fundamental datum of astronomy—the unit of space, an error in the estimation of which is multiplied and repeated in a thousand different ways, both in planetary and sidereal systems. Hence its determination has been called by Airy

'the noblest problem in astronomy.' It is also one of the most difficult. The quantities dealt with are so minute that their sure grasp tasks all the resources of modern science. An observational inaccuracy which would set the moon nearer to or farther from us than she really is by 100 miles, would vitiate an estimate of the sun's distance to the extent of 16,000,000! What is needed in order to attain knowledge of the desired exactness is no less than this: to measure an angle about equal to that subtended by a halfpenny, 2,000 feet from the eye, within a little more than a thousandth part of its value."

There are three methods by which the solar parallax or the distance of the sun from the earth may be measured—by trigonometry, by the laws of gravitation, and by the velocity of light. Two American investigators have employed the last-mentioned method with results that are highly satisfactory. Prof. Michelson, while connected with the United States Naval Academy, began a series of experiments which were subsequently continued at the Case School in Cleveland. By his experiments in 1879 he reached the conclusion that light travels at the rate of 186,355 miles a second, and by those of 1882 he reached the result 186,320 miles a second.

Prof. Newcomb also attacked the problem by means of costly and ingenious apparatus planted at Fort Meyer, near Washington, with a mirror of reflection on the opposite side of the Potomac, at a distance of nearly four kilometres. He found the velocity of light to be 186,328 miles per second. Combining these results with certain conclusions of M. Nyrén, the distance of the sun from the earth is found to be 92,905,000 miles and the parallax to be 8.794″. The history of these important experiments has been given in their relation to other investigations by Prof. Lovering in an address before the American Academy. The story is too technical to be here reproduced.

It is noteworthy that the gifts of private persons and the appropriations of the national Government have been often secured, and in large amounts, for the promotion of astronomy. While other branches of abstract science have received but little encouragement in comparison, the movements of the heavenly bodies have exercised the same fascination upon the minds of Americans as upon the ancient Chaldeans. Congress has repeatedly made liberal allowances for the observation of solar eclipses and of the transits of Venus, and the ablest astronomers of the country have been sent again and again to remote stations, where their ingen-

ious instruments and their skill in observation have been recognized and admired by the most competent judges.

It is only within a very few years past that the science of physics has received from Americans any great amount of attention. Here, again, it is obvious that the demands of a new country have affected its intellectual productions. It is generally conceded that no country in the world has shown more ingenuity in devising new forms of mechanism and new contrivances for the economy of labor. The Patent Office is a vast repository of inventions, some of them idle and unimportant, but many of them extremely valuable. This, however, is not the place for the enumeration or discussion of their merit. Perhaps the best mode of illustrating both the strength and the paucity of American contributions to physical science will be to repeat a comparison elsewhere made between the recipients of the Rumford medal in England and in this country. Toward the close of the last century Rumford, whose name has already been mentioned more than once, desiring to encourage researches into the laws of light and heat, founded two prizes, one of them to be awarded by the Royal Society of London, the other by the American Academy in Boston, for original contributions upon these subjects. One medal was open to Europeans, the other to Americans. In England, Rumford, Davy, and Brewster early received the prize. Then came a barren period from 1818 to 1834, with but one fruitful year, when Fresnel was honored for his work on polarized light. From 1846 onward there is an unbroken series of biennial awards. A mere catalogue of the worthies who have thus been decorated suggests the history of modern physical researches—Faraday, Regnault, Arago, Stokes, Pasteur, Kirchhoff, Tyndall, Jamin, Clerk Maxwell, Des Cloizeaux, Angström, Lockyer, Janssen, Cornu, Huggins, and Abney. In this country the task of bestowing the honor from the first was not easy; no award was made during a period of more than forty years. In 1831 the difficulty of finding worthy competitors appeared so great that the American Academy asked permission from the Legislature of Massachusetts, and finally obtained it, to use a part of the income for purposes akin to, but not identical with, those proposed by the founder of the prize. In 1839, for the first time, an award was made, and the Rumford medal was bestowed on Robert Hare, of Philadelphia, for his invention of the compound blowpipe. Another barren period followed. At length, in 1862, Ericsson received the medal for his caloric engine; and in 1865 it was given

to Prof. Treadwell, of Harvard, "for improvements in the management of heat." It was next awarded, in 1867, to Alvan Clark, for his improvement in the telescopic lens. In 1870 it was given to George H. Corliss, of Providence, for improvements in the steam engine. At a later day it was given to Dr. John W. Draper, of New York, for his discoveries in the theory of light. The next award was to Prof. Willard Gibbs, of Yale College, for researches in thermodynamics. Then came the recognition of Prof. Rowland's work in a study of the mechanical equivalent of heat, and in discoveries pertaining to spectrum analysis. Subsequently the Rumford medal was awarded to Prof. Langley for his investigation of radiant energy and to Prof. Michelson for his measurement of the velocity of light.

Several of our countrymen have won distinction in spectrum analysis. One of the earliest workers upon this subject was Dr. John W. Draper; and subsequently Dr. Henry Draper, whose life was unfortunately ended at the beginning of a brilliant career, added distinction to a name already illustrious, by a series of investigations, which led him to announce that he had discovered the presence of oxygen in the sun.

The recent progress of this branch of investigation, to which no limits are yet apparent, is due in a great degree to the introduction and improvement of what are called diffraction gratings. These have already been spoken of as small plates of metal ruled with very fine lines, and they serve far better than the prisms of an ordinary spectroscope to diffract the rays of light and to reveal the Fraunhofer lines which characterize the constituents of a light-giving body. Rutherfurd was the first American to employ such instruments. But great improvements were introduced by Rowland, who invented a screw of marvelous accuracy, by which the plates are ruled, ascertained the most effective curvature of the plates to be ruled, and devised a new method for their mounting. He did not stop there, but proceeded to experiment upon the photography of the spectrum, and finally to measure the wave-lengths. Although these new diffraction gratings are now to be found in every important physical laboratory, no one has used them more effectively than their inventor in the laboratory of which he is the head in the Johns Hopkins University. He has published two photographic maps of the solar spectrum, and has a third in preparation, which exhibit thousands of Fraunhofer lines. Many of those which appeared on previous maps have been resolved into multiple constituents. This same investigator has published

a table of thirty-six elements which he has found in the solar spectrum; eight elements the existence of which in the sun he regards as doubtful; fifteen that he has not found; and ten that he has not tried. He finds hydrogen, and not nitrogen; oxygen he has not yet tried. Iron, silver, lead, tin, copper, zinc, carbon, and calcium, have been found in the spectrum, but not gold, mercury, sulphur, or phosphorus. This, however, does not prove their absence from the sun—for some good reason generally appears for their absence from the spectrum. Indeed, he says, were the whole earth heated to the temperature of the sun, its spectrum would probably resemble that of the sun very closely.

The services rendered by American physicists to the science of electricity are less famous than the marvelously ingenious inventions of our countrymen in telegraphic and telephonic apparatus. The names of Franklin, Henry, Morse, Edison, and Bell recall a series of discoveries and inventions which have affected the civilization of the world. An extremely accurate determination of the value of the ohm, the absolute unit of electrical resistance, deserves most honorable mention.

The early history of chemistry in the United States is closely connected with one of the most distinguished of English men of science, Dr. Joseph Priestley, who came to America in 1794. His deviations from the orthodoxy of that day involved him in acrimonious controversies from which his upright life and his deep religious convictions did not protect him. He sought relief in the freer atmosphere of the United States. Twenty years previously he had discovered oxygen; and accordingly the year 1874 was observed by the American chemists in a centennial celebration, at his burial place in Northumberland, Pa. On this occasion many papers were read illustrating the progress of American chemistry in the first half of the nineteenth century. Prior to 1850, so-called chemical laboratories were opened in a few American colleges, but they were places for lectures and illustrations rather than for research. Dr. Hare's invention of the compound blowpipe attracted attention abroad and at home, but it stood by itself. Means were not yet provided for independent investigations, nor was the spirit of discovery in this field of inquiry developed until the middle of the century. During the last four or five decades, laboratories for the training of chemists, who previously had been obliged to seek instruction abroad, have been well equipped. In most of the stronger universities researches are now made and the results are published in special journals. For

a long time the relation of chemistry to agriculture was the favorite field of investigation, and it still dominates in the experimental stations for agriculture. But the American chemists have also devoted themselves to purely scientific work, and have won renown especially in organic, and, more recently, in physiological chemistry.

It has been found difficult in this rapid survey to do justice to the various phases of scientific activity, for each one, as it is presented for consideration, seems to require a separate chapter instead of a few paragraphs; but the reader must bear in mind that the object of this survey is not to enter upon such details as the students of special subjects would demand. It is rather to give to those who are not specialists some idea of the fields of research upon which the scholars of this country have entered, and to point out some of the more important contributions to human knowledge made by our countrymen in those departments of thought to which this paper is necessarily restricted.

Let us hope that this review, cursory as it is by its necessary limitations, is sufficient to show that in the United States of America the advancement of knowledge is not regarded with indifference. This is not the place to institute a rigid comparison between Americans and Europeans, but some points may admit of comment. The countries of Europe differ from one another, as the various States of the Union differ. As the ascendency of strong men gives emphasis to particular lines of inquiry, so the necessities of any country or State determine not only its expenditure of money but its employment of intellectual energy. The United States has no leisure class who have inherited the means and the disposition for scientific careers. Its business men rarely seek recreation, as they often do in England, by the prosecution of some branch of science; nor are our universities so liberally endowed as those of the Old World. The ranks of learned men are proportionately less numerous, for other callings than those of scholarship attract the American youth. New States are to be formed, new Territories are to be explored, great highways are to be built, industrial enterprises are to be organized, and in all these financial and political movements a desire to participate in the advancement of knowledge is slowly developed. The great civil war interrupted for four years the ordinary pursuits of the people, but the prosperity which followed the restoration of peace has

led to the generous building up of universities, with their laboratories, observatories, and libraries. Americans are closely in touch with the intellectual movements of Great Britain, Germany, and France. Hosts of well-trained young men are now enlisted in the various faculties. The outlook is hopeful. Nevertheless, the opposition often encountered in the national Legislature, often also in the Legislatures of separate States, when a proposition for some purely scientific work is brought forward, is a clear indication that the country is not yet educated enough to appreciate generally the conditions essential to the highest progress. The lack of centralization in political and educational affairs, upheld as it is by American citizens, established as it is in American life, is not without its disadvantages. The visitor to London, Edinburgh, Paris, Berlin, Vienna, perceives at once the difference between those centers of activity and those to which he is accustomed at home. It still remains true, as intelligent observers have repeatedly said, that while the people of the United States are more generally educated than those of other lands, they are not more highly educated. Forces expended elsewhere upon the few have been directed among us to the welfare of the many. In time the many will begin to call for higher cultivation, for a more generous encouragement of science, literature, art, and education. The trees that are now planted will grow and bear fruit, and their leaves will be for the healing of the nations.

Lick Observatory, Mount Hamilton, California.

THE AUTOR

CHAPTER VIII.

LITERATURE, ART, AND ARCHITECTURE.

AMERICAN LITERATURE.

THE beginnings of American literature are not obscure, but its development is none the less interesting on that account. Its origins are not to be sought in dialects nor in the twilight of song and story, during which a distinct vehicle of literary expression was slowly evolved, as in the literatures of France, Italy, Germany, and England. Bearing this in mind, we shall more clearly understand its development, and its present condition and tendency.

It was once the demand of foreign critics that a new country which had a new government should have a new literature. A new government in time we had—in its peculiar Federal and State relations an absolutely new experiment in the world—but our political institutions, in spirit, were a growth on English lines of constitutional development, an adaptation of a body of tradition and principles to new territory. We inherited these ruling ideas for the conduct of States exactly as we inherited the English language, and consequently the English literature. Inheritance, however, is not the right word: the English who came here brought with them their own literature, with absolute ownership in its origins and history, and the absolute right to develop it and adapt it to the conditions of the New World, that the English had to mold literature according to the changes in the scholarship and social life of England. The literature of the United States was English. There were Dutch here, and later Germans; there were French and Swedes; but north of the Gulf of Mexico, except in the province of Quebec and the State of Louisiana, the literature was English, without any appreciable influence from other sources, and so it remained for a hundred years. Of original pure literature in this time the United States produced almost nothing, though in the fields of politics and theology its vital force was felt throughout the reading world. Toward every effort of liter-

ary expression, however, England took the attitude of a step-mother toward a child that was held subject to sharp correction while treated like an orphan. If it tried imitation, it was sneered at for feebleness, and perhaps justly; if it ventured on any playful originalities of the soil, it was as a savage is who entertains a London season. In time sensitive Americans came to prefer its criticism to its praise, and finally to smile at both as the awkward exhibition of the affection of kin. The smile is without rancor, and simply implies confidence in the future. The development of the United States has only just begun. What it will be in the days when its population covers its vast territory, in wealth, in power, in literature, no man can predict. In its power to make the English language the conquering language of the globe, it is to-day second; it may one day be first. And if it should happen, as the English name was applied to the mixture of Saxon and Danish and Norman, that the language and literature should be universally known as American, England can take the comfort in it that the spring takes in being the source of the mighty river.

During the colonial period, and some time beyond the Revolution, excepting its political and theological writing, America contributed nothing to the world's literature except Franklin's Autobiography. Naturally all our literary attempts were provincial and imitative. The reason commonly given for our lack of fertility in this field is that the new nation was occupied with the practical business of clearing its territory and making a government. There is another reason, however, even more controlling than this: there was no necessity for making a literature; the country had one, and that the richest and most varied in the world, the one that still touches life at more points than any other. It was the literature of the common language. This entirely possessed the field and satisfied all wants. The British poets, the British essayists, the British novelists, were universally read; they stimulated the imagination and guided the thought and the taste of the new nation. We took them as we took British cloth and British hardware. It was the same in the schools. The education was essentially on British lines; even the school readers, the only literature accessible to millions of youth, were compilations from British essayists and poets. The influence of this upon the mind of the nation was incalculably great. This literary dominion continued long after the political control ceased. The intellectual vassalage was universal in this country, and in the South it was not broken until the late civil war. The tone of

this literature, especially in fiction, was monarchical and not republican, although there was much in British poetry to stimulate liberal and even democratic ideas. It was the romances that were most feudal, and that spread most widely notions of a society wholly un-American. The powerful influence of this was not fully perceived until the war of secession disclosed a vast section of the country which drew its intellectual life almost wholly from the classic era ending with George III, ornamented with the feudal romances of Walter Scott. Under the influence of a broadening, more scientific scholarship, in the light breaking in from other literatures, and especially from the philosophic thought of France and Germany, and in the intense agitation of great moral ideas, the North had long before begun an independent life, and was producing vital literature—that is, literature that expressed American thought, but which was less known at the South than in England. Still, even in the North, the colonial note in our literature remained, and the British influence was felt, if it did not dominate, for a hundred years after the Declaration of Independence.

If we could take the point of view of the Americans of the eighteenth century, we should no doubt see that they did not comprehend the necessity of a new departure in literature; and if we take the point of view of nineteenth-century critics on the herbariums, or collections of specimens of the writings of a literary character of the eighteenth-century Americans, we are forced to conclude that their performance was in accordance with their point of view.

In speaking, then, of American literature, we have not to inquire into various indigenous origins, as in a study of the English literatures, but to note the differentiation which is gradually producing something that has new and distinct characteristics in the world of letters. The nineteenth century was well under way before anything was produced that had what we should now call a distinct American note. There were writings on American subjects, notes and comments on the country and its physical aspects, political and social satires in verse; but all these had in tone a British parentage. The psychological romances of Charles Brockden Brown are scarcely an exception, even in their setting, for the scenery is as spectral as the stories, and can not be localized.

We must not, however, make the mistake of undervaluing the quantity of written and printed matter produced in this country

before the year 1800, nor its adaptability to the current popular life. The reader may take a comprehensive view of this in The Library of American Literature, in eleven large octavo volumes, covering the period from 1607 to the present decade, edited by Edmund Clarence Stedman and Ellen Mackay Hutchinson. This remarkable work, now indispensable to the student, thoroughly gleans the field of prose and history; and it is compiled with such skill that it gives not only a fair idea of the thought and literature of the period, but also of the agitations, the manners, and the popular life. More personal details of authors, scholars, and orators are to be found in A History of American Literature, by Moses Coit Tyler, and American Literature, by Charles F. Richardson. When we mention also the revised edition of Duyckinck's excellent Cyclopædia of American Literature, Griswold's collections of poets, male and female, and Appletons' Cyclopædia of American Biography, we see that we have abundant material for the study of our intellectual life.

The trait of the colonial writing, narrative of adventure, theological discussion, or political, is intellectual vigor and independence, and much of it will always be interesting to Americans. To name only a few among the early annalists and writers, there were William Bradford and Edward Winslow (their Journal is an indispensable authority), Francis Higginson, Thomas Morton, Thomas Hooker, Roger Williams, John Cotton, Nathaniel Ward, John Winthrop, Anne Bradstreet, poet and moralist, Captain Edward Johnson, and John Eliot. At a later period were Michael Wigglesworth, the portentous poet of the Day of Doom, William Hubbard, Increase Mather, Cotton Mather, Samuel Sewell, Jonathan Dickinson, William Penn, John Williams, of Deerfield, Roger Wolcott, George Berkeley, Jonathan Edwards, Nathaniel Ames, Mather Byles, Joseph Green, William Livingston, and Samuel Niles.

Conspicuous names multiply in the Revolutionary period. We come into a more decidedly political atmosphere, the poets strike various notes, and we have patriotic songs and ballads, in form British, in spirit American. We have to name great men, and women of social and intellectual distinction; but in all this time the culture of literature is secondary to the development of national life and character. The names that illustrate the period and occur without effort of memory are Franklin, Washington, Patrick Henry, John Dickinson, John Adams, Thomas Paine, Thomas Hutchinson, John Woolman, Samuel Adams, John With-

Independence Hall, Philadelphia.

erspoon, James Otis, Mercy Warren, poet and republican, Francis Hopkinson, author of The Battle of the Kegs, Joseph Warren, Thomas Jefferson, Josiah Quincy, Jr., Abigail Adams, John Jay, Lindley Murray, Benjamin Rush, Robert R. Livingston, John Trumbull, the author of McFingal, James Madison, Alexander Hamilton, John Ledyard, Philip Freneau, Timothy Dwight, St. George Tucker, and Gouverneur Morris.

We glide into a wider area in the early days of the republic, an era of oratory, of more attention to language, of conspicuous legal ability and acumen in political exposition, of more lyrical promise, of more careful biographical work, of a broadening of theology into discussion of moral questions, and of the beginnings of fiction. This change and progress are illustrated by some of the names of that formative era. We have space for only a few: John Marshall, Hannah Adams, James Thacher, Joel Barlow, Mason L. Weems, the ingenious romancer about Washington, John Trumbull, Royall Tyler, Fisher Ames, Noah Webster, Matthew Carey, Albert Gallatin, William Pinkney, Harrison Gray Otis, William Dunlap, dramatist, Alexander Wilson, poet and naturalist, John Quincy Adams, Joseph Dennie, Joseph Hopkinson, Charles Brockden Brown, De Witt Clinton, Josiah Quincy, William Wirt, Eliphalet Nott, John Randolph, Robert Treat Paine, Jr., Lyman Beecher, Henry Clay, C. C. Moore, author of A Visit from St. Nicholas, James K. Paulding, Francis Scott Key, J. T. Buckingham, Joseph Story, Washington Allston, Daniel Webster, John C. Calhoun, Robert Young Hayne, and Joseph S. Buckminster. Many names that were prominent in the latter part of the eighteenth century became still more conspicuous in the first quarter of the nineteenth, and it is impossible to make any exact classification. But it is to be noted that, while there is much good literature, and literature expressing the spirit of American life, in the writings of the authors and writers whose names have been given, in the colonial and in the early-republic periods, the pursuit of literature was not a recognized calling in those periods.

We reach in Washington Irving the first American contributor to the world's literature, and the first successful American author who lived by his pen. Yet, if we estimate him by the standard that we set up to-day as American, we can see that, in the mass of his writings, he was in the line of British essayists and historians. Only in the Legends of the Hudson, and in the Knickerbocker History, do we find that which is not only racy of

the soil, but which is to a certain extent new in manner. It is customary to say that in the Knickerbocker is the origin of American humor. The statement needs qualification. The subject was fresh, the treatment was in a spirit of burlesque not so new—a sort of gigantic exaggeration not unfamiliar in English letters, which owed its effect largely to mockery of real heroic achievements. It has very little of the note that later on America was to add to the humor of the world. With the Legends the case is different. Not only were the characters and the romance here of the soil, but they had a subtle flavor absolutely belonging to the new life of the country. And in his method of treating trivial things with gravity, Irving at least anticipated a marked trait in later American humor. Perhaps in the example of Irving, that an American book could become of interest beyond seas, was Fenimore Cooper's encouragement to write fiction, although American wares were still so unfashionable, that—as some of the earliest silk-makers in this country could only sell their products here by putting on them a foreign name—he printed his first novel with the catching explanation that it was "by an Englishman." Cooper, however, made a distinct departure in the way of an American literature. He was the author of the first sea-story which commanded general attention in the world, that was written by a man familiar with the sea and its navigation. But his distinction was even more marked in another direction. He introduced the landscape into the modern novel—that is to say, scenery as a feature woven in the story, and a necessary element of it. In his most characteristic stories, those dealing with the aborigines and their enemies the sturdy pioneers, the American wilderness, lakes, mountains, prairies, the vast savagery of the new continent, are essential parts of the new creation. He not only used American material, but he used it as it had not been used before. It was this originality in theme and in method, this note of a fresh virgin life, that carried his stories in translation all over the civilized globe, and gained him eager readers in Teheran as well as in New York.

It is not the purpose of this chapter to pass in review the great mass of literature that has been produced in this country. The compilations of it, which are accessible to every reader, show that in bulk it is considerable enough to imply great intellectual activity; but the larger portion of it is provincial, in the sense of being a reflection and not having vital originality. Nor would it serve any purpose to point out that portion of it which might

without any incongruity be included in an English compilation of the literature of the first half of the nineteenth century. This portion would include sermons, a few pieces of oratory, travels, a very few biographies and volumes of letters, some poems, many essays, scientific and linguistic disquisitions, and a small number of novels and short stories. What we seek to trace is a distinctively American growth and performance. With little qualification we may say that the colonial period in our literature lasted down to the war of secession. The list of exceptions, though marked in quality, is short. Merely as an illustration of what is meant, it is sufficient to refer to Lowell's Biglow Papers, the first half of Judd's novel, Margaret, and to Thoreau, who was a pure American product. The renaissance in New England before 1860 was largely due to the agitation of moral questions, but was greatly stimulated by an influence distinctly not English, an acquaintance with German philosophy and literature. This preceded the application of the scientific method to the investigation and study of literature and to the writing of history. Our historic composition has sharply changed its character since the war, although archæological scholarship in a scientific study of American races had prepared the way for it, and Francis Parkman had already begun his series of monographs in the new spirit. It is worthy of note that George Bancroft's History of the United States, the first volume of which appeared in 1836, was wholly recast in his later years, in obedience to German philosophical methods quite as much as on the compulsion of newly discovered evidence. We shall have more to say later on of the foreign influence upon the literature of this country; but it is well to note here, before considering some peculiarities of our literary life, that our distinctive contributions, which have given us standing in the consideration of the world, have been in scholarship rather than in *belles-lettres*. In pure literature—that is, in the romance, the novel, the essay, in poetry—the great names are still few; while in philology, in critical literary investigation, in historical monographs, in science, in archæology, especially relating to our own continent, the names are many, and rank with the first anywhere.

The literary era, which is still distinguished as that of Irving and Cooper, shows a great awakening in all our intellectual life. Oratory began to broaden beyond the political field, poets of recognized permanence in English literature appeared, history of dignity and philosophic purpose was written, literary criticism

and the essay, moral, social, and concerning Nature, took new form; there were representatives of philosophy, of humor, of inquiry into our aboriginal period, of education, of the coming agitation in moral and social reforms. A few names will recall this era. William C. Bryant was first recognized abroad as a poet of high rank, but as truly American were R. H. Dana, R. H. Wilde, James A. Hillhouse, Fitz-Greene Halleck, John Howard Payne (if only for one poem), Joseph Rodman Drake, R. C. Sands, John Pierpont, and James G. Percival. It was the time of William Ellery Channing, the champion of free thought; of Audubon, the naturalist; of Schoolcraft, the ethnologist; of orators like Thomas H. Benton, Nathaniel Beverly Tucker, Edward Everett, Thomas Corwin, Gerrit Smith, and Rufus Choate; of William H. Prescott, the romantic historian; of Palfrey, the historian of New England; of George Ticknor, the historian of Spanish literature; of William Ware, the author of Zenobia; of Seba Smith, the historian of Old Hickory; and of A. B. Longstreet, the writer of Georgia Scenes.

How the conspicuous names multiply, and how brilliant they are in the years from 1835 to 1860, many of whom lived to the full ripening of their fame long after the civil war! In this time the scientific method, in history, in language, in fiction, in the study of men and Nature, had only faintly manifested itself. In Boston it was marked by that revolt from authority, and that spiritualization of thought, which had the name of transcendentalism, and which, coming at the time of the antislavery agitation, more or less affected the brilliant group of writers of that vicinity. It was never such a metaphysical movement as that which years later in the West, and especially in St. Louis, had its devotees, who were inquiring the way of Plato, and Kant, and Hegel. The most important names in literature are Emerson and Hawthorne, Holmes, Lowell, Longfellow, Whittier, and Poe; but there were many other poets—N. P. Willis and G. P. Morris, who scarcely escaped the sentimentalism of the period; George D. Prentice, Edward Coate Pinkney, Albert Pike, and a long list besides. Among the historians were George Bancroft and Richard Hildreth; among the religious teachers were Horace Bushnell, Mark Hopkins, Tayler Lewis, O. A. Brownson, Theodore Woolsey, Leonard Bacon, and Theodore Parker. But in this period also were William H. Seward, John Brown, Garrison, Edmund Quincy, C. M. Kirkland, the novelist, William Gilmore Simms, Charles Fenno Hoffman, poet and essayist, Charles Francis Adams, and Margaret

Fuller. In 1851 Mrs. Stowe wrote Uncle Tom's Cabin, and before 1860 Abraham Lincoln appeared as a great leader of the people.

In a sketch like this it is impossible to name all who have contributed to our literary life, or to separate in periods those whose work has extended beyond one generation. Since 1860 the names are so many that special mention will not be attempted. Of those who had a national reputation before 1860, we may add to those above, James Freeman Clarke, Wendell Phillips, Charles Sumner, Horace Greeley, Henry Ward Beecher, John Lothrop Motley, R. H. Dana, Jr., Henry D. Thoreau, J. G. Holland, Julia Ward Howe, Walt Whitman, H. H. Brownell, poet of the civil war, Herman Melville, T. B. Read, Donald G. Mitchell, George William Curtis, Edward Everett Hale, Francis Parkman, T. W. Higginson, Edmund Clarence Stedman, Thomas Bailey Aldrich, Richard Henry Stoddard, Bayard Taylor, Charles G. Leland, Charles Eliot Norton, William D. Whitney, philologist, and William C. Prime.

Among the peculiarities of our literary life the quality of American humor is the one first thought of. But, before considering that, we may mention a phase in our development when we may be said, not inappropriately, to have been "in the doldrums." It was the sentimental period.

This, in time roughly estimated, was from 1840 to 1860. It was contemporary with the transcendental movement, with which it had nothing in common in inspiration or results. In that period much of the literature of which we are most proud was produced. The sentimental phase was more widespread than the other, and had a multitude of causes. It was, in a way, the first-fruits of the superficial American school education. There was an impulse to write without adequate equipment. Some critics have traced its genesis to the Knickerbocker school, and consequently to Irving. There is only a grain of truth in this. It was perhaps natural that imitators of Irving, lacking his humor, should be sentimental. There was a Knickerbocker coterie, and it was the center, for a time the only center, of literary aspiration throughout the country. It had its mild affectations, it mixed a certain facetiousness with its sentiment, it had a little touch of fashion and of knowing life, but its ear-mark was a certain painted pathos. With all its faults it was not mercenary; it had ideals and aspirations purely literary; it liked to talk about books and authors, and not about prices. The great names in literature, and even the contemporary little names in England, awoke in it enthusiasm and love. It could

prize and even adore relics of men of letters. Writing then did not pay much except in glory, and the producers drew closely together in good comradeship and often in mutual admiration, and there were symposia in which the songs were about wine and eyes divine, and the sad, sad dance of an unheeding world over newly made graves.

The prevailing literary forms of expression of the sentimental school were poetry and the short essay, or sketch, as it was called. There are authors still living who looked upon this period as a genuine literary renaissance—and perhaps do still—and who expected great things from it which have never been realized. The spirit of the time had many manifestations, and it produced books of real sentiment which have endured. Perhaps its characteristic feature was exhibited in the newspapers. It is remembered as the day of the full-blown advent of women as current writers in America. With the modesty of the wild flower, many of them took sweet, alliterative pseudonyms for the public—a fashion that some men also adopted. They poured out floods of poems and sketches, all substantially of one character, though the note varied from that of reminiscent sadness to that of jaunty knowingness, in a style that was described as crisp if not as saucy. Some of these writers, men as well as women, were exceedingly popular. Scarcely any newspaper appeared without one or more of these bright or pathetic sketches or vivid paragraphs, which were copied from one end of the land to the other; and many of them, afterward gathered into volumes, had a great sale as leaflets, or wavelets, or thoughtlets, or what not. Nothing in life, old age, youth, babyhood, was safe from sentimental uses. There was much crying over the old farmhouse; the old garret was ransacked every few days; all the old yellow letters were got out and tenderly pawed over; the old well-sweep was kept in motion. The little baby was more hardly worked than anything else; dead or alive, he had to turn a paragraph, and his little shoes were never put away. A wedding, a funeral, rain on the roof, a man on a railway track, a widow, an orphan, the back-kitchen door, were equally good subjects for moralizing. Even the unbelieving newspaper man caught the spirit, and, though he did it with a grin, he often soaked his local columns in tears. But the sorrow in all this wave of sentiment was not very deep; it was an indulgence rather than a misery, and there was not a particle of pessimism in it. Life was an occasion for emotional and sentimental writing, but it was otherwise cheerful, and there was no disturb-

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Craigie Mansion, the home of the poet Longfellow.

ance of faith. The careful student of this curious phase will no doubt find that this expression in letters was not an isolated phenomenon, but that there was a popular sentimental era which had also its exhibition in the emotional political demonstrations—in the hickory, fox, coon-skin, log-cabin, pole-raising, and hard-cider campaigns.

This maudlin period of fine writing wept itself out naturally, but its exit was accompanied by the jeers of the American newspaper humorist, who carried his laughter over false sentiment to the pitch of irreverence for all sentiment. The names of S. L. Clemens and Charles F. Browne are especially connected with the later campaign against sentimentality. The American humorist was already recognized, or, at least, American humor was already labeled as a distinct species. When it captured the newspapers it had an unprecedented field of evolution. It was not simply that nearly every newspaper had its wag and funny man, but there was a prevalent humorous method of treating even commonplace topics and of narrating events. This was modified by time and culture into the present witty paragraphs and humorous editorials which distinguish the newspapers of America, and bring upon them the charge of lack of seriousness and of dignity, of excessive flippancy and want of reverence. It is necessary to keep the newspaper in mind in this review, because much of the humorous writing which is known over the world as American had first an ephemeral existence in the newspaper, and because the spirit found in it is characteristic of an admitted quality in American literature, and in much of it that is not professedly humorous.

This quality of humor is elusive to definition, and those who attempt to define it are entangled in the same meshes as those who draw distinctions between wit and humor. The comments on our life which make us laugh are as often witty as humorous. We may say that it is the sudden discovery of resemblances between things incongruous, or a ludicrous juxtaposition of contrasts, or that it is Brobdingnagian exaggeration, or that it is a studied and facetious understatement. But these are traits of all wit and humor, though it can be said that the moderate tone of understatement which characterizes the most outrageous bragging is more prevalent in America than elsewhere. It is this which is illustrated by the old story of the American abroad who belittled all that he saw in comparison with his own country, and when asked in Italy, after crossing the Alps, if he had not noticed the

mountains, confessed that he had passed some rising ground. The truth seems to be that the American has a new way of looking at life, and, underneath this, that he has a new life to look at. The conditions are new. This is evident when we consider the early humorous sketches and stories written in Georgia and the Southwest, or of the Pennsylvania Dutch, of the New England Yankee, and, later, of pioneer life on the Western plains and mountains and on the Pacific slope. Here were absolutely fresh scenes, characters original, such as the world had not known before. If man and Nature were not in wholly novel relations, the relations were such as to develop a new sort of personality and social state. Inevitably these characters would acquire a peculiar mode of expression and a conception of life in accordance with their circumstances. Perhaps a humorous view was born out of the contrast of the greatness of their opportunities with their limited power. They were face to face with an amazing new world. They learned to be patient and to make a joke of hardships, to be self-reliant, and to be facetious with personal limitations and failures. It is noticeable how much of the effect of the most successful American humor is due to the contrast of the assumed personality of the writer with the scenes and situations he depicts. Another undoubted characteristic of this humor is its irreverence for tradition; but this can only be a temporary basis for any literary success, and be amusing mainly to the uncultivated. The sources of American humor are deeper than this. They are found in the development of new character in new conditions, and the humor is stimulated by two other causes: the first is the intellectual excitement due to free institutions, and the second is the fact that when men emigrate, travel, make new settlements, the master-faculties are usually limbered and sharpened. Besides, our population has not only been moving westward, but it has all along been re-enforced by various races, and there have been constant activity and emulation. Where there is joy of living and overcoming, there is likely to be primitive humor, though much of it may be grim and too realistic for the approval of the cultivated reader. It is probably due to movement, and to some extent to mixture of the wits of various races, that the American people are generally quick-witted, keenly apprehensive of the ludicrous, and apt to take a humorous view of life; and their perception is not only ready but fine. They can see a joke although it is not broad, and they do not need to have it elucidated by a diagram nor to study it a day or two. This is true of Americans generally, although as a nation

they may not lack gravity, or may even be grim in demeanor, slow in speech, and not seldom taciturn. Much that passes for American humor is entirely local, and its acceptance depends upon the comprehension of local peculiarities. Much of it also amuses by the contrast of strictly private affairs with continental conceptions, as in the Western newspaper obituary of a lovely girl who had borne with angelic meekness the suffering of a lingering illness, until "yesterday her pure spirit took its flight to its heavenly rest at 4.15 Denver time." Franklin set the example of a grimly brutal, practical-joke sort of humor, when he asserted in Poor Richard year after year that the editor of the rival almanac was dead; and the editor had great difficulty in making the public believe that he was not dead. It was a question of veracity. In the line of this is the newspaper habit of attributing preposterous sentiments to public men or to famous authors, pretended quotations of absurdities from leading journals, and of inventing a newspaper on the frontier from which manufactured extracts are reproduced full of unconscious social vulgarity and "high-toned" bravado. Much of this humor exhibits itself in "sells," inventions of phenomena, strange appearances and disasters, usually given in scientific language and with a painful show of accuracy, with the purpose of fooling a public which enjoys being fooled, when the bamboozling is done as cleverly as it was in Locke's Moon Hoax.

These are all manifestations of an exuberant juvenility, conscious of abundant space and time, which will subside when the country reaches the more settled order of European societies. Is there, then, any permanent quality in American humor which distinguishes it from the humor of other peoples and times, and which will have an appreciable effect in forming a national literature, with a recognizable character of its own? The answer to this must be in the affirmative, if the humor is based, as has been said, upon traits of character not found elsewhere, and not wholly upon the contrasts of a juvenile society with novel situations and giant possibilities. Difficult as it is to define this humor, it is beyond dispute that both the prose and poetry it pervades and enlivens are known and can be described by no other term than American. There is already a sufficient body of this writing to have made a mark in the world. It has a new flavor, although in a literary point of view much of it is mere drollery and low comedy. There is reason *a priori* to suppose that it will endure, refined and humanized to more universality, as a constituent in

the literature of the future; but only as a constituent, for the shape and scope of that literature will be determined by more important agencies.

In reviewing the literary product of this country before 1870 we are now able to make certain distinctions. Of the whole body of theological, economic, scientific, and political writing little need be said in this discussion. The contribution to the thought of the world in these fields has been more than respectable; it has been original, and instinct with the spirit of a people agitated by novel situations and opportunities, but in form it has marked no special departure from the parent stem. Much of it might be charged with a tone of deference to British authorities—a deference which has practically disappeared in the last twenty years. Even in the early colonial period the political writing was marked by vigor and lucidity, and it had the distinction of dealing either with new theories of government or of applying old theories to new situations. But it was a development in sympathy with the great British mind rather than a departure. To see this clearly, we have only to contrast the American political writing with the French.

In the departments of writing more purely literary America has been in leading-strings till recently; this was exhibited by imitation, by deference, and by sensitiveness. Success was reassured by British approval. The colonial period in letters—and with some individual independence it must be extended to 1860 at least—can not, however, be disposed of in a lump. It was all more or less provincial, but as to some of it the epithet provincial is a title of honor. A little of it would take its place, as has been said, in any collection of English literature, with no other mark of its origin than its subjects. The bulk of it, which was imitative, perishes like imitative writing everywhere, like the contemporary ephemeral product in England. A line of writers of distinction was maintained in England and Scotland, but the United Kingdom produced a mass of writing which was no better than that of our colonial product. Before 1850 we had added some names of men of letters to the roll of those who write English which are imperishably inscribed there, because they belong to the universal world of letters. One of them—Hawthorne—may be mentioned, not only for the reason that his style gives him high rank among the writers of English, and that he was a creative genius and one of the small number of men whose imagination has been a sure diviner of the human soul, but because in all that he wrote there

is a certain quality or flavor which can only be defined as American. Given the story of The Scarlet Letter, no novelist not born and bred in the spirit of American life could have made it what it is.

Some of the literary product from 1800 to 1850 (poetry and prose) will take its permanent place with the literature which is understandingly called American. It was provincial in the sense of truth to local conditions; it described a society that did not exist elsewhere; and it was not and is not yet comprehended by British critics, who lack the knowledge of our institutions, political and social, to understand either its truth or its limitations. Their failure to do this was one of the things that gave the *coup-de-grâce* to the lingering American respect for British criticism. Yet, in fairness, it must be admitted that too much was expected of the British critic because of kinship. The provincial writing under consideration was entirely faithful to local conditions, but it lacked that note of universality that would commend it to foreign critics, and especially to critics to whom English is a foreign language. The literature which dealt with our own life in the local spirit of that life was most acceptable to our own people, but it was probably unreasonable to expect the English to understand it simply because it was in English. In the forum of the world that only can be of general acceptance which has the note of universality, and has at the same time the national flavor, like Don Quixote.

The element of language is also to be considered in this estimate. The English language is a growth, always in flux and development, and in its extraordinary adaptability to life is the prophecy of its supremacy. It has been made a reproach that it has been Americanized in this country. But the criticism that dwells upon Americanisms is hardly less futile than that which points out Britishisms. Since the founding of Boston and New York, the English language, both that of literature and of speech, has changed greatly in England. In some respects its development in this country has been more conservative than in England; it has been more tenacious of words and old forms, while at the same time it has diverged. This divergence has been due, in regard to orthography, to a practical turn of mind, to impatience with surplusage and with tradition, and it has been compelled in regard to new words and new uses of old words by a variety of contact with forces very powerful in our national life. In the first place, the aboriginal inhabitants have left their mark upon our

geographical nomenclature, and to some extent upon the speech of domestic life. In the settlement of a vast territory there have been isolated communities which have preserved and manufactured peculiarities. The pioneers, in novel contact with Nature and obstacles, have added to our vocabulary. But, besides all this, we have come into living relations with the Spanish, the French, and the German, and more recently with nearly every language of the world spoken by those incorporated into the mass of American citizens. Under these circumstances it is marvelous that the divergence of speech and writing is not greater than it is between England and America. It is idle to prophesy whether that divergence will increase in the future.

The scientific spirit, the inductive system, new methods of research as well as of education, have been as strongly felt in the last fifteen or twenty years in literary as in technical scholarship. The effect has been most marked in our histories and biographies. The series of monographs on men and on historical periods, published within ten years, have been of a very high character, and show a revolution in the method of our study of life. We can not particularize here, but only indicate what we mean by a reference, in historical composition, to the History of the People of the United States, by John Bach McMaster; to the History of the Administrations of Jefferson and Madison, by Henry Adams; to the historical monographs of John Fiske; and in literary scholarship to the English and Scottish Ballads, by Francis J. Child; and to the Studies in Chaucer, by Thomas R. Lounsbury. Like influences, affecting the subjects and the methods of fiction, giving at the same time the note of reality and of "modernity," are powerful in the whole school of recent American fiction, of which the names of Bret Harte, Henry James, William Dean Howells, George W. Cable, and Richard Malcolm Johnston may be taken as typical. In the art of the short story, and the novels of race and place, America is pre-eminent in the last decade, and the list of writers of original quality and flavor is already too long to be catalogued in a paper of this character.

In the days of our literary dependence this country, as said above, has added something to the body of literature in the English language, in poetry, in essays, in novels; and lately in history, biography, archæology, philology, and works requiring high scholarship, and distinguished by the modern methods of research and criticism. The present is a time of immense activity, and full of promise of greater achievements. There was a time

when, stung by the taunt of provincialism, the American people had a vague idea that the duty was laid on them of producing a literature that should be unmistakably American; they were expecting always the American epic and the great American novel —that is, a story of American life comprehensive enough to include the vast republic in all the variety of its development, and in all things characteristic of this country alone. That was a notion belonging to childhood, and entertained before the American people themselves comprehended the immense variety of local peculiarities in their enormous territory. The difficulty of generalization was experienced when an attempt was made to define and characterize an American. Was it a person having the manner, the habits, the speech, the spirit of Maine, or Massachusetts, or New York, or South Carolina, or Virginia, or Texas, or Ohio, or Minnesota, or California? What is the typical American? Where exactly is the typical American society that can stand for the country in a work of fiction? American novels there have been of world-wide acceptance, and an American novel which shall rank with the few great pieces of fiction of other literatures is always a possibility; but it will be great not in an attempt to embody all varieties of American life, but in its faithful study of human nature under certain defined conditions. The ambition of bigness has passed away, and the development of a real American literature is going on in traditional inherited lines, modified by certain influences which are plainly at work here, and which may carry it very far in a distinct, commanding position in the world of letters.

The first of these is the realization of independence: the courage to strike into new paths; the consciousness that the most intelligent criticism is home criticism, and the most valuable recognition is home recognition.

The second is a more exact scholarship: the training in modern methods of research; the application of the scientific spirit to the problems of history, of biography, and to the study of men and women for the purposes of fiction. The result of this is truthfulness, the desire to see human life as it is, in its inward meaning as well as its outward manifestations.

The third is the national spirit: the historic consciousness of a country with a destiny. No author can sing the songs or make the novels or write the history of a country with which he is not identified in every patriotic aspiration.

The fourth influence is cosmopolitan. While America was in

British leading-strings it took its models and its mode of looking at life from one source. It is now opening its windows to the stimulating literatures of the world. It is hospitable to the French, the Russian, the Spanish, the Italian, the German. Its ambition is not only stimulated by contact with foreign masterpieces, but the new foreign ways of looking at life are lessons. We are in less danger of imitation than we should have been years ago; but we learn from them how to look at our own life, to see it in its reality, and to interpret it by the aid of an idealizing imagination. The lesson we have learned (and which the writers of England have also been learning) is to study our own life as the masters of foreign fiction study their life. The effect is already evident in a daily increased production of minor novels and short stories which are locally faithful and yet universal in character. There is an analogy in the sister art of painting. We may have one opinion or another about what was called the American school of landscape, but we recognize the revolution in art in all branches since our young artists went abroad to study in the schools of drawing and painting and fell into the historic line. When the artists who have been educated abroad, or their pupils, apply their acquired skill in technique to the interpretation of American life, we shall in art have a truly national development of a high order. It is so in literature. The cosmopolitan spirit increased our sense of the dignity and value of our own characteristic life. Our literary production has become more and more American within the last decade.

This is hopeful, because the first requisite in any literature is faithfulness to time and place and to the spirit of the national life; but it is not saying that much of the production, though instinct with a new spirit, is not crude. Fresh materials, in character, in nature, in incident, and the perception of their value, will not suffice for the creation of a universal, enduring literature. Literature, even in America, will remain an art, to be cultivated like any other. There is a quality which sometimes seems to be the result of the discipline of generations of cultivation, of refined social conditions, of keen intellectual competition, of training in the use of words, of a refinement of thought which transmutes the ore into gold. This quality does not exist without form, without style—well-knit, vigorous, lucid style—and a perfect simplicity in exhibiting the most profound and noble thought and the most complex life, but it also implies a divining power to place before us life as it is, without literary vulgarity and without exaggeration. Our pres-

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ent literature, in its commendable eagerness to report facts, is somewhat careless of form, and, if it does not lack keenness of observation, it lacks refinement of execution. The writer, whatever his material is, can never be permitted to be vulgar. There is some imaginative work now done in this country which in finish and refinement of spirit ranks with the best anywhere; but most of it attracts simply by reason of the freshness of its material, and is flimsy in construction and poor in quality compared with the best in England and the best in France. We can not plead lack of recognized types. The politician, high or low, for example, we are well acquainted with, but he waits the master who shall represent him in fiction as he is; the "grand lady" we have seen since colonial days, but her delineator in fiction has not yet appeared. We do not lack variety of types, and some of them have been carefully studied and portrayed, but the woman of fashion and the man of the world have been scarcely touched.

In concluding this brief view of the situation, it may be said that the studies of American life are very promising for the greater canvases to come, and that already many local types have been treated with excellent art. The intellectual activity that was predicted to follow the shaking up of the great war is seen in every department of letters. The production in the imaginative and in the historical fields was delayed till time should idealize the material and clarify the vision. In the science of language and of things, in the works of research, of history, and of biography, the new republic is closing the century with brilliancy.

The expected outburst of an era of production of the highest order in poetry, in the drama, in fiction, may be delayed longer than the sanguine expect; but the elements are gathering. The encouraging indications are the emancipation from colonial conditions; the promise in the fusion of the wits, of the temperaments, of the genius of many nationalities in one artistic purpose; the lesson taught by the best models to study our own life; and the richness of material in a continent which presents almost every conceivable variety in Nature and in man. No one is idly dreaming of a repetition of the splendid periods that followed Marathon, and the destruction of the Spanish armada; poetry and the drama may never flower again in such bursts of bloom, but it needs no prophet to foresee that somehow, in some form, America will express herself in the arts and in literature. We are told that, like the Roman, our genius is for works of utility; but those who

know best the forces at work in this country feel that materialism, strong as the current is, can not overwhelm the aspirations of a higher life. There is a spirit here growing with the universal education, and with an increasing love of learning for itself—a recognition of the spiritual element, that will not be content with any material expression.

AMERICAN ART.

The conditions governing the development of the fine arts in this country are of such a complex and peculiar nature that the subject may well be approached "on the knees," the attitude declared by the eminent painter Ingres to be the only proper one to take in the presence of the mysterious goddess Art. It is proper to assume that the same conditions which have furthered the progress of art in countries which have artistic traditions and history may be regarded as equally active and potent in a comparatively new country like our own, for art is essentially born of emotion, cradled in reason and common sense, and reaches its maturity of growth by a long process of assimilation of truths of Nature. It can no more be cultivated by legislation than the love of music can be created in a people by the decrees of an autocratic ruler. I am well aware that the terms "reason" and "common sense" are by no means commonly applied to art, and that the so-called encouragement of art by the government of a nation is popularly believed to be not only wise and beneficent, but indicative of the climax of culture and civilization to which the community has attained. In a superficial study of the principles underlying the production of all good art, the vital element of intelligent selection is usually lost sight of in the glamour of facility of execution, novelty of treatment, and other easily recognizable qualities. Selection is governed, of course, by reason and common sense directed by taste, and taste in its turn is acquired and stimulated by familiarity with good things. The Greek artists were eminently distinguished before all men of any age or any race by the possession of these same intellectual qualities, and the perfection of their art is due to the happy combination of mental characteristics under the peculiar conditions of their civilization. The most cursory glance at the history of art since the period of the artistic supremacy of the Greeks will show that,

whenever the artist has been hampered in the exercise of his faculties by the restrictions which are the necessary accompaniments of government or national support, he has degenerated in exact proportion to his loss of independence, and the result has always been a temporary season of material prosperity and influence followed by a corresponding loss of creative force and artistic initiative.

The belief that great commercial prosperity of a country, creating as it does a demand for art, therefore insures a parallel advance in the quality as well as in the quantity of artistic productions, is as great a fallacy as the argument that because other nations have distinct schools of art the rise of a new school, and even a new style, may be prophesied here. The history of art in England effectively disposes of the first of these fallacies; and the fact that all political frontiers, in so far as they may be supposed to define in any way the character of artistic effort, are practically annihilated by modern science, settles the second beyond dispute. The conditions of social life here, the unique political situation, the high standard of education, and the state of progress which is the result of the restless and indomitable energy characteristic of our people, combine to make the problem of artistic development in this country entirely different from any other presented in modern times. With few distinct and fewer encouraging traditions of native art behind him, the artist in this country enjoys neither the stimulus which comes from popular taste and appreciation nor the secondary but necessary encouragement of material support. The fashion of travel and the facilities of transportation force him into close competition with foreign artists, with great disadvantages of both a material and a moral order in the way of production. No honors are to be gained from the people or the State, his profession has no public status, and the popular but ignorant and antiquated notion that there is no serious side to art still remains an active and potent factor in the practical and utilitarian forces which are arrayed against him. The brief chapters in the career of an American artist may be summarized as follows: He spends the most impressionable years of his life between studying in an art school and some occupation which gives him fair promise of sufficient recompense to enable him to pursue his studies abroad. He enters an art school in a foreign capital, and proves that with all the disadvantages of his early education he can take rank with any student in any branch of the profession. After his student days are over he has to decide the question

whether to expatriate himself and lead a congenial life in the stimulating atmosphere of professional sympathy and support, or to return home and add his efforts to the sum of individual endeavors directed with rare devotion and self-sacrifice toward the development of artistic talent in his native country. If he chooses the former course, he may and often does become known to fame and fortune; if he selects the latter and nobler career, his life becomes a round of teaching, struggles with sordid conditions of professional life, and the wearing and soul-killing battle with lack of appreciation and encouragement, not to say distrust. I believe this to be an accurate condensation of the chapters in the biography of the majority of native artists. All honor should be freely and frankly given to that numerous body of expatriated American artists whose works place them in the first rank of the profession abroad and occupy prominent and well-earned positions in every foreign exhibition. But let us grant a laurel wreath of no less perishable quality to those who, in the enthusiasm of youth and patriotic pride, devote their energies and expend their talents in the anxious and continuous conflict at home, for it is to them that we owe the credit of fanning into a consuming flame the vital spark of artistic impulse which exists among us.

I have said that the profession of art can claim as yet no status in this country, in comparison, of course, with the social position it holds abroad; and the proof of this fact is found not only in the experience of the members of the profession, but in the columns of the daily press, which reflect, with a near approach to accuracy, the tone of the public mind. A magnificent building is erected, a notable example of the work of a scholarly and talented architect. At the laying of the corner stone and at the dedication exercises fulsome praise is given to the Midas who has supplied the funds for this gratification of his personal vanity, or to the committee whose energy has contributed the noble monument to the architecture of the city, but the name of the architect has no place in the roll of honor. A statue is erected in a public place, and in the ceremonies of unveiling and presentation the sculptor has no recognition, and oftentimes his name is not even mentioned. The portrait of a hero or a political leader is added to the Walhalla of the nation or of a State, and the torrent of eloquence is not disturbed in its flow by an allusion, however slight, to the artist whose genius shall hand down to posterity the name of man and make it a familiar word long after the temporary glory and ephemeral power which it once suggested shall have vanished

and left no sign. A public committee is appointed to carry out some elaborate plan of celebration of an anniversary or to do special honor to some famous man. Politics, the army, law, medicine, and the Church, all are represented on this committee; but in this array of honored guests is seldom found one of the profession whose training and peculiar talent give his services a unique value. These are crude indications of the status of the artist in this country, and however trivial they may seem to the observer who finds hopeful tendencies in deeper channels than those referred to, they still testify with unqualified directness to the lack of popular appreciation, which is the great stimulus to artistic effort. Indeed, if the subject be pursued further, we shall find that not only does the artist suffer from the meagerness of moral support, but is even the victim of popular distrust. Our cities are made hideous with monuments selected by ignorant and thoughtless politicians, and our public buildings are imperishable records of bad taste; but the artist's voice of disapproval and his protests, however strong, are drowned by the trumpet tones of the self-appointed arbiters, who frankly declare the artist to be impractical, visionary, and prejudiced. For years, and in the face of every discouragement, the profession has urged, with a near approach to unanimity, the abolition of a tax on art, which was imposed without their knowledge or concurrence, for no reasons of revenue or political expediency, but for the mistaken notion that foreign competition hindered the progress of art at home. Congress after Congress meets, has its attention called to the absurd spectacle of the protected clamoring for freedom from protection, impatiently listens to the arguments of the artists who have only the large interests of their profession at heart, listens but distrusts, and a tax remains.

In this brief consideration of the status of the artist in this country I have not thought it necessary to analyze the causes for this condition of things, for they are found in the spirit of our institutions. But the very causes which have hitherto retarded the development of the æsthetic sense among us have already begun to react so strongly, that there can be no doubt that art will flourish here within a very short time with a vigor and freshness of growth unparalleled in modern times. This is a prophecy based on facts. In the first place, the spirit of Puritanism, which is radically opposed to art in any form, has had its day, has run its course, has performed its work. The natural reaction from the influences of this spirit is already felt. The most eminent

American artists to-day are of old Puritan stock, and nowhere is the appetite for art more keen and more insatiable than in the communities where the most rigid Puritans once strangled with a cruel hand all expression of emotion and stifled all outward indications of human feeling.

Previous to the Philadelphia Exhibition there had been a long period of indifference to art, beginning with the extinction of the school which flourished here as the offshoot of the parent school in England. The awakening of a dormant love of art in every form was the noblest result of the congregation of people from all over the civilized world, and the assemblage of the choicest products of human skill, intelligence, and taste. What followed the first burst of enthusiasm was the establishment of schools all over the country, and for a decade there was a feverish preoccupation with methods of teaching, materials, and modes of procedure. This first stage in art education has already shown definite results, some of them encouraging because they form a real basis for advancement, others deplorable because they have created a false sentiment in regard to art. In the first category may be properly placed the facilities for preliminary art education which, in the short period referred to, have grown to be quite as perfect as any in the world; the organization of societies and the forming of institutions for the exhibition of works of art and for the general encouragement of the interests of the profession; and the awakening of a definite ambition for the study of art from a nonprofessional point of view. This period of the mechanics of art education was necessarily long because the field was new, and phenominally active and brilliant because there were few deeply rooted stumps of traditions to be pulled. The seed flourished with the rank growth and crude vigor of primitive cultivation, and the plant naturally possesses all the baser qualities of the inevitable results of defects of propagation. The art schools founded in every town of importance all over the country have assembled eager and enthusiastic students, of both sexes and of all conditions of life, who have been fully initiated into the preliminary processes of production. There has been no uniform or harmonious system in this teaching, no relation of schools to each other, and consequently no standard of education higher than that erected by the individual instructor. It is not strange, then, that the majority of students, mistaking inclination for special talent, have worked at the rudiments, acquired a certain skill, and are now floundering in the depths of ignorance of the principles

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Law School, Harvard University.

of art, buoyed up by their technical skill alone. The young women who formerly would have spent their idle hours practicing the Maiden's Prayer on the piano now struggle with colors and canvas; and the young men, inoculated with a vague ambition to become artists, have deserted even the bat and the paddle for the brush and the palette.

Happily for the prospects of art in the near future, we are fairly well over this first period, and begin now to see a glimmering of daylight through the shrouding mists of early dawn. As in the first stage of common-school education the promoters of the system spent most of their thought and a large share of their energies on the material part of the system, the shape and size of desks, the schoolhouse and all its conveniences, the text-books and school discipline, so in a manner quite analogous our instructors in art have been forced to devote much of their effort to parallel if not naturally similar details. I have referred above to the commendable zeal and self-sacrificing labors of the young artists who have made art education in this country a possibility, and it is not to their discredit that there exist the notable faults in this education suggested by a brief analysis of its results. The elaborate system of art training which has been so great a success in France and in other foreign countries is probably not desirable, even if it were possible, in this country. We can not expect to have the centralization which is the backbone of the system in foreign countries; but without prejudice it must be acknowledged that art education as we know it here needs something higher than centralization, something more intangible than a standard, something better than the requirements of technical excellence; it needs the balance-wheel of appreciation, love and loyal regard for the true and the beautiful, for taste, for intelligent selection, and for the great principles which have been the strength and support of art from the beginning. In this hysterical fever of ambition we are tossed on every new wave that breaks the fair, calm surface of artistic progress. But these movements which reach us from across the ocean have, in addition to their original impulse, an acquired momentum which is sustained by our belief in the honesty of their origin. It is impossible for us to regard them calmly or to turn for guidance to past experience or tradition, because in our eagerness to advance we forget to examine the causes of the movement, or to consider whether the tonic is demanded by our special weakness. In this way we are hampered by influences which should be turned to our advantage,

and delayed in our real progress by these serious distractions from our singleness of purpose.

The situation, complex as it is, undoubtedly has its encouraging side. If we compare the quality of work shown in our annual exhibitions with that which a few years ago was respected and admired, or if indeed we venture on drawing a parallel between our own exhibitions and similar but larger institutions abroad, we shall be convinced that as far as average excellence goes we are in no degree behind. Our artists do not attempt the production of pictures or statuary of the monumental character shown in the exhibitions abroad for obvious reasons, the chief of which is the fact that there is not only no demand for such work, but there are insurmountable difficulties in the way of its accomplishment. But the set of the current is unmistakable. Here and there on the walls of almost every exhibition may be found pictures with qualities of individuality, good taste, and excellence of execution which would demand recognition and compel admiration in the presence of the best art produced to-day. There are notable examples, however rare, of eminently serious and irreproachable tendencies, where the artist has outlived the constraining influences of his early training, has forgotten methods and materials, has given free rein to his fancy and imagination, and has drawn his inspiration from the pure sources of all good art, governing his effort by the immutable principles of truth adorned by beauty. One great proof that we are to have good art here—not necessarily American art, but the art which knows no country and no century—is the fact that these tendencies receive prompt and substantial recognition not only in the limited class of connoisseurs at home but in the most highly cultivated circles abroad. If, in the whirl of commercial prosperity, amid all the distractions of active and ultra-modern life and the accompanying unrest which is death to artistic production, we find a constantly increasing number of serious artists, what may we not expect when the luxury of leisure is possible in this country?

The influence of the Centennial Exhibition in Philadelphia has been briefly alluded to, and a parallel argument can be drawn from every international exhibition ever held. The event has always marked a period of transition more or less distinctly defined according to circumstances, and history will repeat itself here. In 1876 this country was ready for the seed, and the young harvest is now prepared for the ripening process which is sure to follow the World's Columbian Exposition at Chicago. The geo-

graphical situation of the Exposition is not the least of the reasons why its influence will be unparalleled; for in the infant cities of the great West the exuberant energy and vigor which have been applied to the development of commerce and agriculture have already been directed toward the calmer paths of cultivation and education. Museums and private collections of works of art have been founded, and no money or effort is spared to fill the galleries with the best works which can be bought. Masterpieces of modern and ancient art find their way to the shores of the Great Lakes, and even across the Rocky Mountains; thoroughly equipped art schools have been established in all the large towns; and the system of foreign art scholarships which has come into existence within a few years will soon extend its branches to the farthest limits of the United States. There has been seen at Chicago the most complete and representative collection of modern works of art ever assembled, and this at a time when the people are in the most receptive mental condition in their history, and are intent on the possibilities of their higher development. The best architects of the country have entered into an informal and friendly partnership to erect a group of temporary buildings, not alone utilitarian, but noble in proportions, many of them fine in style and distinctly educational in design and treatment. Details of ancient architecture have been employed freely, not in clumsy imitation of originals, but adapted with consummate taste and skill to the perfection of the adornment of the buildings. Statuary has been made use of to supplement and enrich the architectural features, and mural painting in its turn has taken its proper place in the trio of allied arts. There are in this country very few buildings of permanent form where this alliance has been attempted, although it has existed in all great monuments of architecture since earliest times, and it is one of the encouraging signs of progress here that the importance of purely decorative features is at last receiving distinct recognition. It is strictly in accordance with the immutable laws of civilization that architecture should gain the first footing in any country, that sculpture should follow closely in its train, and painting give the final touch to the perfect whole. We have wallowed in a mire of bad taste, ignorance, and impudence in architecture from the colonial period down to the recent revival of the mediæval and classical spirit. Our Government buildings take an easy lead in the procession of architectural horrors which has marked the retrogression in taste curiously coincident with the advance in methods of construction.

From the marble monstrosities of Nob Hill to the chamferesque cottages of the Atlantic seacoast we have reared imperishable monuments to our haste to get rich, and our consequent blindness to the elements of good taste in architecture. In recent years the tide has turned, and there is now no doubt that it has set in the right direction. The glories of ancient architecture are suggested in the World's Columbian Exposition with all the freedom of a skillful sketch and with all the grand proportions of the originals. In addition to the architecture and the embellishments of sculpture and painting, casts of antique statues and monuments, scattered about the grounds and adorning the classical colonnades and porticoes, have provided a unique object-lesson of unparalleled value to the public, and create an appreciation and respect for the perfection of antique art which will have the most vital and healthy counter-influence against the paralyzing effects of the iconoclastic spirit of ultra-modern art. Taking the alliance of architecture, sculpture, and painting as one of the results of the Exposition of 1893, the next decade will be the most interesting one in the history of art in this country, for the painters will have the opportunity for monumental work which is the summit of every artist's ambition and the most exhilarating stimulus to effort. There is every reason to congratulate ourselves that we are exactly at the critical period in our artistic development when this prospect is most welcome. With this goal in sight, all petty difficulties will vanish; the longed-for art atmosphere will be created, and the status of the artist will be assured.

An Outline of Development.

The history of American art covers less than a century, but in order to appreciate its progress we must note its successive periods. Neither the few colonial "limners" nor the Anglo-Americans, West and Copley, furnished a real beginning for American art. Charles Wilson Peale and Colonel John Trumbull were the seniors of the first characteristic group of American artists—a group which may be held to include Gilbert Stuart, Allston, and Malbone, and a little later Jarvis, Sully, and Vanderlyn. The general aim of these men, whose manner was affected by Italian and English influences, was the heroic expression of history, ideal and allegorical themes and portraiture. The next stage was when Thomas Cole, followed by Durand and Doughty, founded the first school of American landscape, and at nearly the same

time the National Academy of Design came into existence. Rembrandt Peale, Weir, Morse, Ingham, Harding, and Inman, the first of our *genre* painters, belonged to this period, and they were joined by Daniel Huntington and William Page. Huntington, however, belongs more properly to a later school, which for many years dominated our art. The influences of the time were academic and conventional, and yet many of our latter-day amateurs and art lovers have forgotten the respect due the absolute sincerity and love of Nature shown by their predecessors. The seniors of this group were Elliott and Hicks among portrait painters, and Kensett, S. R. Gifford, Gignoux, F. E. Church, Mignot, Mount, Lang, and Darley among painters of landscape and *genre*. About 1844 Leutze led the way to Düsseldorf, which exercised the strongest influence upon our art for many years. It was but the exchange of one convention for another still more rigid, with the counterbalancing advantage, however, of more exact and systematic training. Thus the Hudson River school, so called, a school often held too lightly, represented American art up to the early seventies. In 1869 William M. Hunt showed the way to Paris and broader methods. It is interesting to speculate upon the possible effect upon our art if Americans had turned to Paris instead of Italy and Düsseldorf, and had encountered the influences which found expression in the romantic movement led by the men of 1830. The new blood which began to assert itself in our art in the seventies had been nourished in Paris and Munich studios. It was a time of awakening. New influences were at work in illustration, wood engraving, sculpture, and decorative art. The Academy received the newcomers coldly, and the Society of American Artists was formed, with W. M. Chase, Olin L. Warner, Alden Weir, and Augustus St. Gaudens among its earliest members. Presently amateurs learned that the freshest and strongest work of the day was to be seen at the Society's exhibitions. There were vicissitudes, there were mistakes and excesses, but the Society kept its vitality; and as new men returned from Paris year by year, its exhibitions became more and more important. With the formation of the Fine Arts Society, of which the Society of American Artists forms an important part, and the erection of a magnificent home in New York, it has become clear that the younger brother of the Academy is assured length of days and prosperity.

This is but one phase of our astonishing artistic development within less than twenty years. Boston, Philadelphia, Chicago,

Cincinnati, and St. Louis have become centers of art education as well as New York; and Detroit, Milwaukee, Minneapolis, Baltimore, Washington, and Atlanta show art schools or collections of an importance which in two cases reaches the first order. The Centennial Exposition gave a mighty impulse to the awakening hunger for knowledge not only of pictorial art but also of ceramics, embroidery, wood carving—indeed, all the applied arts. It was the Centennial Exposition which developed a love of Oriental art that has influenced and enriched us to an extent not to be lightly estimated. It would be a rash prophet who would venture at this time to gauge the influence of the Columbian Exposition not only upon our academic and applied art but perhaps even more upon our architecture.

At this exposition American art has been judged in comparison with the art of the world, and the test has had a thoroughness never approached before. The verdict is in our favor. American art, without any national vainglory, must be acknowledged to have held its own. That the influences were foreign may be freely granted, but the ability to learn and to execute was our own. With painters like Sargent, Inness, Winslow Homer, Dannat, Alexander Harrison, Thayer, Brush, and Tryon; with water-color artists and illustrators like Abbey, Smedley, Frost, and Pyle; with sculptors like Warner, St. Gaudens, and French; and with the monthly records of work in metal and silk and wood, the formation of new artistic societies, the endowment of new art scholarships, the increase in our public and private art collections, and the advance in taste shown in the exteriors and the interiors of public and private buildings, no one need despair of the republic of art, even though much that we bring forth must be ranked as assimilation rather than creation. The outlook is hopeful, and the Columbian Exposition, if we mistake not, is the dawning of a new and nobler period of American art.*

* William Dunlap's old volume upon the earlier American painters, and Art in America (1880), by Mr. S. G. W. Benjamin, are the most helpful reference books regarding our painters in oil. Prof. G. E. Woodberry's History of Wood Engraving (1883), and Etching in America (1886) and American Water-Color Painting (1889), by Ripley Hitchcock, treat the development of these arts.

THE DEVELOPMENT AND PROSPECTS OF ARCHITECTURE IN THE UNITED STATES.

The United States is a new but not an isolated nation; its roots extend as far back in the Old World as those of any other people; and its progress in architecture is constantly indebted for inspiration and refreshment to the aggregate experience of mankind. But there are some conditions affecting the development of architecture in the United States which are quite without precedent. Civilization was begun here without aboriginal traditions or monuments of a nature to serve as starting points, and to give initial force to the earliest demonstrations of art. The structures erected by the natives of the soil, however interesting from an ethnological point of view, had not, at the time of the first European invasion, developed any principle of design, which seemed, in the presence of the much more potent influences which we are yet to consider, capable of progression in the service of civilization. These structures varied in form according to the social or geographical conditions of the scattered tribes. But from the conical wigwams of the North and East, constructed of branches of trees, covered with hides or bark, to the more permanent and advanced communal houses or pueblos of the South and West, whether executed in adobe or stone rubble, whether built on the open plains or on shelves of rock in the cañons, these erections never transmitted any ideas of form or structure which could be converted to practical use in the evolution of a national architecture.

It would be unreasonable to assume that these primitive dwellings, or even the log cabins of the early settlers in the wilderness, did not possess qualities as capable of development into a definite and characteristic system of architectural forms as the Aryan hut or the other simple and obvious constructions, from which, according to the archæologist, were evolved finally the royal palaces of Thebes or the Greek temples. But when the English established their colonies on the eastern seaboard of the North American continent; when the Dutch settled in New Amsterdam, the French in Canada, the Carolinas, and Louisiana, and the Spaniards in New Mexico, Florida, and California, they brought with them the manners, customs, and traditions of ancient civilizations. Their new homes were built according to the fashions prevailing in the seventeenth and eighteenth centuries in England, Holland, France, or Spain. At first they brought with them, or imported from the

old countries, many of their building materials. The stronger races overwhelmed the weaker, and the beginnings of American architecture were thus analogous to those of Gaul after the invasion of the Romans, or to those of England after the Norman conquest. The aboriginal council house and the pueblo of the Indians thus lost their only chance to be the progenitors of an American style of architecture. But almost immediately the new structures began to assume a character different from their prototypes, and this character was imposed upon them partly by the economical and social conditions of new colonies, but mainly by difference in building materials and climate. In this way arose what we must recognize as old colonial architecture—a term which is applicable to all the colonial styles, but which by usage is confined at present to the old English forms. As English institutions, with the political successes of that people, spread among the Eastern colonies, the contemporary English taste and prejudices gradually prevailed, and the civic, domestic, and religious buildings of the better sort in the New World were intended to be, so far as their modest decorative character was concerned, exactly similar to those contemporaneous in the old country. The English fashions and habits of thought were transferred to their colonies. But the buildings, like the colonists themselves, through the influence of their environment, became gradually differentiated from those of the mother country, and assumed provincial characteristics.

While the colonies were establishing themselves in the New World, the immediate successors of Wren were building Blenheim, Castle Howard, and a little later Somerset House. The English fashions of the period in architecture were directed by Hawksmore, Vanbrugh, Gibbs, Sir William Chambers, and the brothers Adam; and some of the earliest work in New England, especially churches, were, it is said, built after designs made by some of these masters. But where in the old country the work was executed in stone, or in brick with stone details, in the new country the construction was apt to be in wood, or in brick with wooden details. The architectural character of the former was derived from Roman traditions as they were then understood and interpreted in England and adapted to English use. The Roman orders, formulated in a pedantic spirit, were the basis of all architectural design. But when these were executed in wood, it was soon found that proportions adapted to stone structure were too massive and ponderous to be repeated in the lighter material. Thus gradually it became common in the provincial work to attenuate

Ponce de Leon Hotel, St. Augustine, Florida.

the orders. Columns and pilasters became higher in proportion to their diameter, entablatures lower in proportion to the height of the columns or pilasters supporting them, and at the same time the facile nature of wood enabled the builders to give to the details a greater delicacy than would have been readily practicable in the monumental material.

In ecclesiastical work the new interiors followed, so far as the colonial exchequer would permit, the venerable traditions established in St. Stephen's, Walbrook; in St. Mary-le-Bow; in St. James, Piccadilly; in St. Martin's-in-the-Fields, and other contemporary English churches; and their exteriors, depending almost entirely on their towers for architectural character, endeavored to imitate the steeples and lanterns of Wren.

The domestic work of the better sort was formal and stately; it carefully avoided picturesque or romantic expressions, and its studied symmetry, its fastidious precision of detail, its modest dignity, indicated a large but ceremonious hospitality, drawing strict lines of demarcation between the official or aristocratic society and the rest of the social world. Old mansions of this sort are preserved with reverent care along the seashore of New England, especially in Portsmouth, N. H., Salem and Cambridge, Mass., and Newport, R. I. Within a range of fifty miles from the coast they are not unusual in the Middle States, and on the banks of all the principal waterways of Virginia and other Atlantic States of the South. Many of these old seats have passed nearly unscathed through the social and political vicissitudes which have intervened between the colonial time and our own. But the constant divisions to which all estates are subjected in the absence of laws of primogeniture and the consequent separation of families have made it difficult to maintain unbroken the generous households from father to son, through which alone the traditions of these venerable homesteads could be kept alive.

These architectural characteristics were disseminated by the builders in the less conspicuous structures which made up the cities and towns of the colonies, and even in the farmhouses of the remoter settlements, as soon as they began to replace the provisional log cabins. The architecture of those days, even in its most humble demonstrations, was preserved in a line of consistent development by the fact that there was only one fashion of design then known and recognized in England as proper to be followed, viz., the Renaissance according to Wren and his followers. The Roman orders of architecture, which formed the basis of this

Renaissance, had been so analyzed and formulated in accessible books that it was quite possible for any intelligent carpenter of that day, tempted by no other methods of design, to build well and to decorate with conventional correctness merely by following the rules set down in the Carpenters' Guides of the period. This accounts for the frequency of fair classic detail, though often crabbed and impoverished, in nearly all the buildings of the old colonial times, and indeed up to the beginning of the present century. During this time the architecture of our country was in the hands of builders who fortunately did not know enough to attempt to invent. As regards structure, they built economically with the most available materials, and in proportion as these materials and the methods of handling them varied from those extant in England the results of structural form varied, thus beginning a process of evolution, which, if uninterrupted by the enlargement of knowledge and by the consequent experiments in other styles, of which I shall presently treat, would have almost necessarily resulted, if not in a characteristic style, at least in a very marked divergence from the original types.

In respect to decoration, they used the Roman formulas of columns, pilasters, and entablatures, together with the architraves, window caps, and balustrades of the Italian Renaissance, all as they were understood in England in the eighteenth century. These, if not very elastic, were at least safe; these formulas, however, were not developed from the structure, but applied to it. If they had been a part of the structure, as the structure had in it principles of growth and speedily assumed new forms, the decoration would have promptly been carried along with the development and would have soon ceased to be loyal to the English originals. Thus the characteristic mansion of colonial times was usually a construction of square plan in brick or wood, with a wide hall or passageway dividing it into equal halves. As a structure it was complete in all its essential parts before it had begun to assume architectural character. For this it depended upon a pompous portico at the main entrance, upon a great cornice constructed in the form of a full entablature, sometimes supported at the angles by pilasters; its windows were framed by molded architraves, surmounted by carved or molded pediments or frontispieces, and the roof was crowned with a belvedere or with a balustrade decorated with vases. All these details were apt to be of wood, but they were correct according to the established dogmas of the orders adopted. No builder had imagination enough or audac-

ity enough to attempt to improve them. If there was a necessity for attached out-buildings, these were equally arranged on each side of the main structure so as to form a symmetrical composition. The necessity of securing such a composition was paramount to any considerations of practical convenience or necessity. The test of ingenuity in the builder was to obtain this result with the least sacrifice of internal comfort. The whole architectural scheme was artificial and punctilious, and it was for a long time singularly free from caprices, irregularities, or diversions of any sort. Respectable conformity to a highly conventional ideal by an expression of orderly arrangement was the most exalted aim of the builders. They obtained in their interiors bountiful spaces, grand staircases with easy ascents and wide landings; carved and twisted balustrades; apartments of state whose walls were paneled in wood from floor to ceiling; chimney-pieces delicately molded and carved with prim festoons, garlands, and swags of buds; ceilings crossed by finely molded beams, and decorated with the sort of stucco-work made fashionable in the old country by the brothers Adam; paneled wainscots crowned with molded caps, which were embellished with dentils, rosettes, or triglyphs.

A century earlier than this, in the Southwest, Spanish missionaries were converting the Indians, who, under their direction, erected, with adobe or rubble, mission houses with arcaded cloisters or porches, and churches with modest towers and belfries, piously preserving the characteristics of rural prototypes in Spain. Many of these are in ruins, but some are in use to the present day. The zeal of the Spanish Catholic propaganda appears in these remote regions in its best and most admirable form, and no documents of the history of this proselyting are so significant as these humble memorials of pastoral and self-denying labor. In Mexico, where the traditions of Spanish occupation are preserved in their purity, this type has with remarkable fidelity been developed with the progress of civilization into a style which, having been gradually adjusted to the local conditions of climate and use, we recognize as peculiar to Mexico and as distinctly and legitimately divergent from the contemporaneous architecture in the mother country.

In like manner the creole architecture of New Orleans is sufficiently distinctive in character not only to serve as a record of the French spirit which prevailed, and is still prominent, in the older settled regions of Louisiana, but as a starting point, unfortunately little used, for the evolution of a style characteristic of

the local climate and customs, perpetuating the memory of the race which planted the seeds of civilization in that part of the continent.

These English, Dutch, Spanish, and French seeds planted here in the seventeenth and eighteenth centuries, though not sufficiently ancient to be venerable in a European sense, nevertheless bear important witness to the early history of our country, and should be encouraged to grow and to fructify under the enlarging influences of our later prosperity. In the absence of aboriginal monuments of a character fitted for such growth and enlargement, these colonial monuments are the only patriotic starting points with which we are furnished, and the experiments which have been made with some of them recently are successful and interesting enough to justify a reasonable continuation, not after the manner of antiquaries, who are only concerned to preserve and repeat the old types in their purity, but after the manner of artists who use these types as *motifs* of design, developing their hidden capacities in the life and light of the end of the nineteenth century far beyond the dreams of those who first introduced them upon the soil. They are points from which progress may be legitimately attempted, especially when confined to the regions where they were first transplanted. But it has been impossible for architects to avoid the temptations to digress from these patriotic starting points and to indulge in excursions, experiments, and revivals, in which of late our strength has been dissipated and our ideals confused.

It has been intimated that those revivals which we may regard as patriotic, because based upon our own colonial reminiscences, are legitimate if begun and followed in an artistic and not in an archæological spirit. If these revivals are undertaken with the purpose of progress and development, they will endure, so far as the capacity of the style revived will permit, and bear fruit; if they are attempted simply in deference to a sentiment which can only be gratified by strict conformity to precedent, by imitations, and by unimaginative fidelity to certain old-fashioned types of form, the result may be acceptable for a time, but they have proved, and will always prove, to be barren, and will pass away and be forgotten, just as the corresponding fashions in bureaus, chairs, and cabinets, in hats, coats, and costumes have been forgotten. But furniture and clothes, when old-fashioned, are laid aside and removed from sight, while the products of architectural fashions or revivals, which have gone by, lag superfluous, and con-

tinue to confront the vision and offend the intelligence of mankind.

It should never be forgotten that the architecture of a country, in its general characteristics, is not an accident, but one of the principal results of the vast forces which created the individuality of that country. It arises not only from the necessities of mankind but from their aspirations. It is intimately connected with humanity, and is the exponent of it. For this reason the unprecedented conditions involved in the creation of this new nationality should logically carry with them a new and corresponding development of architecture. It is naturally expected of us. It is as yet difficult, if not impossible, to form a correct judgment as to our success in this. By theory we have a right to assume that we have already more or less unconsciously established many local characteristics of architecture. Many of these we can detect and explain. Some are admirable and some are to be deplored. We have existed as a nation only a few years more than a century. No historical style has taken shape in so brief a time. These styles we may understand because we are far enough from them to see them in true perspective. We read them by a succession of great monuments which have happened or have been fit to survive. As for us, we are living in the midst of experiments in style; the unimportant accidents and incidents of progress at our unfavorable point of view impress themselves upon our mental vision unduly. But though we must leave to our successors of the next century the true analysis of what we are accomplishing, we may trace some of the lines of development and reasonably anticipate by analogy some of the results.

The seeds of architecture which were sown by the European colonies have not all fallen upon fruitful soil. Some of them attained a certain growth which, if they managed to survive the commercial stagnation which followed the Revolution, was interrupted after the first quarter of the present century by the introduction of new fashions, or more especially by the progress in the arts of construction, which necessitated or suggested new forms inconsistent with the colonial types. But though architects have here and there, and from time to time, revived these types, and though these types have in this way enjoyed the advantage of a certain degree of development, these growths have been for the most part sporadic. They have never taken shape in any large, patriotic, or comprehensive movement which we can now appre-

ciate, or which as yet seems likely to have any permanent effect upon the national type.

In California the local Spanish style which, although primitive and pastoral, is full of suggestions and apparently quite capable of adaptation to the advancing civilization now rapidly taking possession of the regions where this style formerly held sway, has as yet had little or no expansion. The local architecture is a faint reflection of whatever may be fashionable or customary elsewhere in the country. It certainly is not of the soil, although the late frank revival of the local style in the California Building at the World's Fair, and in the extensive buildings of the Leland Stanford Junior University at Palo Alto, near San Francisco, may lead to results more germane to the country and to the picturesque history of its early occupation.

In Florida, however, the seat of the Spanish colonies on the Atlantic coast, the adaptation of the more monumental forms of Spanish art to modern use, as in the Hotel Ponce de Leon and the Alcazar at St. Augustine, has been so successful, promising perhaps more than a mere revival, that we may not unreasonably hope to see in that appropriate region an acclimatization of this interesting style.

The old-fashioned provincial French buildings in certain quarters of New Orleans, and probably here and there in some of the earlier settlements of Louisiana, seem to remain not as models for imitation but as memorials of the past. We do not know of any recognizable effort to revive their characteristics.

In New York the memory of the stepped gables, the fantastic finials and weathercocks of the Low Countries, is almost obliterated, though in domestic work the architects still, now and then, but with no serious intent—rather as a relief from the monotonous cultivation of more elegant styles—repeat the homely picturesqueness of the Dutchman of the seventeenth century.

By far the most popular of these colonial revivals is that of the English type. This is apparently a mere revival, not a continuation. It was begun within the last fifteen or twenty years, largely through the influence of patriotic sentiment, and, as a consequence, it has been thus far rather archæological than artistic, rather correct than progressive. Indeed, it seems doubtful if this movement, however it may commend itself to the ideal of elegant domestic life, has any higher motive than that which has caused us to rummage among old attics and country houses for the spindle-legged sideboards and cabinets and the Chippendale chairs

and tables of our grandfathers. In this case, apparently, the architect is working with the furniture people, and often with most agreeable and harmonious results. The combination has a fine suggestive flavor of our modest and homely antiquity. Perhaps it is better to masquerade in this rather patriotic guise than in the imported affectations of Louis Quatorze, of Louis Quinze, or the Empire. To the architect it is very agreeable to occasionally work with the decent and orderly systems of forms which this revival implies, to be relieved of the necessity of manufacturing or inviting picturesque situations and irregular outlines, and of straining his resources of design in order to surprise his public with new things.

When the new nation in the West ceased to be provincial it became cosmopolitan, by reason, perhaps, of the great amalgamation of races which took place under its hospitable flag. With regard to architecture, therefore, it entered with the beginning of the century upon an era of experiments in the form of revivals of old styles—mediæval and classic, Byzantine, Romanesque, and all the infinite variations of the Renaissance—unconsciously seeking, as it were, a type which, if possible, would stay by us; which would expand with us; which would be hospitable to new inventions, new methods of structure, and new uses, and would express all that part of the national genius which can be expressed in architecture. Most of these revivals proved to be retrogressive and consequently barren, because the revived types had already received all the development of which they were capable. Until within the last quarter of the century we have pretty closely followed English examples in these revivals, and if we have not "bettered our instruction," we have at least not failed to give to them more or less unconsciously an American character. This individual character has been derived legitimately from the distinctive character of our materials, of our methods of construction, and of our manners and customs in general; also, to no small extent, from that audacity of invention which is the result of want of training, and from a baleful habit of imitating architectural forms with sham work and cheap materials, which is the result of attempting to do large things with small resources. This habit, though it no longer prevails in the older parts of the country, still, as I shall presently have occasion to explain, holds full sway in the West.

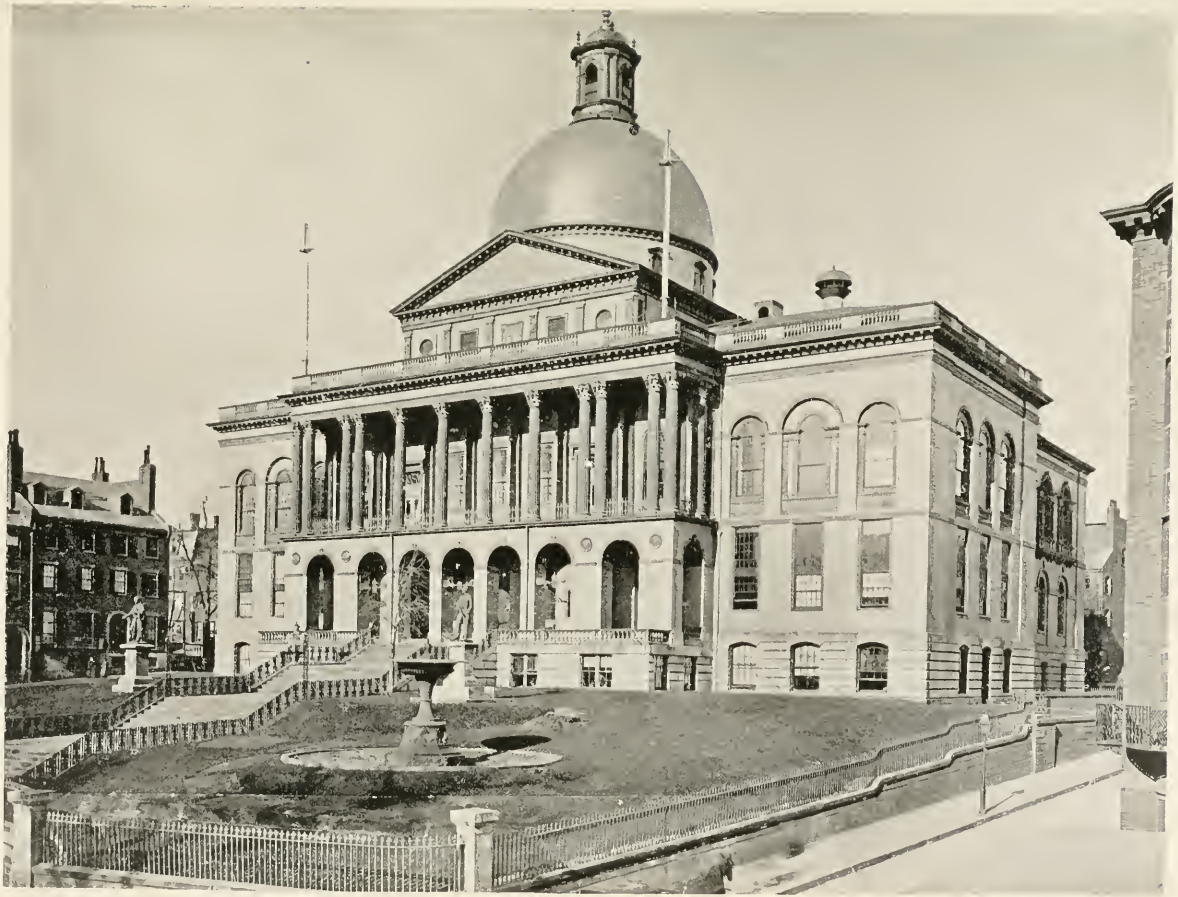
Current architectural work in the Old World has been made immediately known to the profession on this side of the ocean by

foreign architectural periodicals and other publications and by the art of the photographer. Under these circumstances the American mind, in the absence of national *motifs* or styles powerful enough to hold their own against the temptations to follow any fashion which may be set by the practice of the older nations, has been, until the last few years, quickly affected by contemporaneous European experience. Our work has been, to a large extent, a reflection of the work done in Paris and London.

When the world first became acquainted with the external expression of Greek architecture on the publication in 1762 of the famous work of Stuart and Revett, The Antiquities of Athens, a curious revolution began in the practice of architecture in England. Greek forms, as contrasted with the Roman forms, which had received characteristic English development at the hands of Wren and his followers, became fashionable. The Greek temple began to appear in England; the Greek orders were profusely imitated and travestied; and at the end of the last century, there being no quarantine to protect us against the invasion, the fashion made its appearance in this country. The columns of the Parthenon were imitated in wood, and the strange exotic was set up in front of the civic buildings of the time and imposed upon the more stately country houses of our aristocracy. The Temple of the Winds and the Choragic Monument of Lysicrates were profusely parodied in belvederes and cupolas. A set of characteristic Greek decorations was formulated for the use of our unlettered builders, and by them applied to mantelpieces, doorways, and window frames. But the formulas were limited in number, their repetition became wearisome, and the fashion did not last for more than ten or fifteen years. The cumbrous solidity of the Greek peristyle was an impediment in the way of modern traffic and modern necessities, and the spirit of our people was already far too practical to endure a dignity so inconvenient, so monotonous, and so little adapted to our uses. But this pseudo-Greek architecture was extensively used in the better sort of planters' mansions on the lower Mississippi and generally throughout the Southwest.

Our civilization was not at that time able to comprehend the principles of Greek architecture or to apply them to the regeneration and perfecting of the modern ideal. This remains the task for our children to undertake.

One of the most interesting of these pseudo-classic demonstrations was devised and constructed by Thomas Jefferson at



State House, Boston.

the end of the first decade of the century, and after his permanent retirement from public life, at his seat at Monticello and in the buildings of the University of Virginia, of which institution he was the illustrious founder. The Greek and Roman orders in his time were not beautiful materializations of principles, elastic, expansive, instinct with life, as we have since discovered them to be, but systems of absolute and rigid formulas of proportion, to be imitated with religious fidelity. They were merely visible exponents of the learning and civilization of the ancients. Jefferson, like many other gentlemen of high culture and artistic feeling, had committed these formulas to memory as a part of his classic education, and when he was minister to France he availed himself of his opportunities to imbibe all the technical knowledge concerning the classic styles which could be obtained from books and from the current practice of the French architects, who were then the guardians of these formulas. While he was in the Cabinets of the first and second Presidents, and while himself President of the United States, the project of building a national Capitol and an official residence for the Executive assumed definite shape, and among many perils and jealousies his powerful influence was an important factor in so directing the results of legislation that in the building of these two monuments the best architectural traditions of his time were employed, if not under his immediate direction at least with his constant encouragement and active sympathy. Doubtless in this beginning of the official architecture of the country he secured us against the disaster of a false start. The fact is important, for these two buildings, which are more after the manner of Sir William Chambers perhaps than that of any other European master of the time, set an example which has since been followed with the intention, if not the success, of fidelity in the great majority of the national buildings throughout the country, and in most of the State Capitols.

The general scheme of the original Capitol, which in fact is the central kernel of the present greatly extended edifice, was presented in a public competition by Dr. William Thornton, an English amateur resident in this country—a man of erratic genius, who recalls that much more successful amateur, Dr. Claude Perrault, who a century earlier built the famous eastern façade of the Louvre. But this dilettante composition was developed, corrected, in fact redesigned and constructed, by B. H. Latrobe, a trained architect, who came to this country in 1796.

In 1817, after the burning of the Capitol by the British, Latrobe

was succeeded in the charge of the reconstruction by Charles Bulfinch. Among the very few who stood at the beginning of our national art, and who materially aided in giving to it direction and respectability in the early days of the century, the name of this modest and accomplished gentleman deserves most honorable mention. Like his predecessor, he was a man of cultivated mind and an architect of high grade. He was a graduate of Harvard and a citizen of Boston. Among his more important works are the State Houses of Massachusetts and Maine, and several of the churches and other characteristic monuments of Boston, the influence of which gave form to the public and private buildings of New England for many years. His works are notable for their seriousness and sincerity, and for a certain rigid and perhaps Puritanic correctness of style.

Thomas U. Walter, the honored second President of the American Institute of Architects, extended the Capitol by the great wings, built the lofty central dome, and, in general, gave to this pile a nobility of aspect which renders it entirely worthy to be the seat of the Congress of a great nation.

For many years the function of designing and building the Federal court houses, custom houses, post offices, and other national structures has been in the hands of the supervising architect of the Treasury Department. This overworked official, having rarely less than fifty or sixty of these buildings in process of simultaneous construction, and finding it impossible to give to each that especial and personal care without which the designing and conduct of a public monument can not result in a work of art, has been constrained to organize his office so that the work intrusted to it may be done in an expeditious and official manner by his clerks. Under these circumstances the national monuments have for the most part become mechanical and perfunctory in style, though generally following the type of the first public buildings of which I have spoken. Unlike all other civilized nations, therefore, we can not point to our later national architecture as representative of the best art of the republic. Legislation, however, prompted by the American Institute of Architects, is likely to result in the immediate future in a reform which will at last make available for this important public service the best talent of the country.

When the English-Gothic revival entered upon its career early in the century, until the time when it gradually began to lose its influence only a few years ago, there was a corresponding revival

here, following in all its phases, in religious, civic, and domestic buildings, the contemporaneous progress of this remarkable movement. For a long time it took nearly entire possession of the architectural conscience, and was sustained here, as it was in England, by the literary expositions of Pugin, Rickman, Ruskin, Scott, and the innumerable other writers who, following Victor Hugo, seemed to prove that the Gothic path, or, more correctly, the romantic, as opposed to the classic, was the only path which could be trodden by honest and earnest practitioners. The success of this appeal to the reason and conscience of the profession of architecture is the most remarkable phenomenon in the history of the art. In so far as this appeal was a propaganda of principles, and aimed to make truth and honesty and other abstract ideas of conduct the leading motives of design in art, it was wholesome and salutary; but in so far as it contended that the only proper embodiment of these principles or ideas was contained in the revived mediæval forms it was erroneous, because, in fact, it was a revival not so much of principles as of forms which had already, five centuries ago, run their course and exhausted their capacities, having reached perfection at the end of the thirteenth century. The principles which actuated this movement, but which were misapplied in it, and many of the monuments which resulted from it, remain; but the moral furniture of Eastlake and Talbot, which also was its legitimate product, has long since been relegated to the attic and has been lost to view.

The range of experiment in this style was far more excursive here than in the old country, and far less correct, by reason of our natural and characteristic want of respect for historic precedents; and I have no question that the capacity of the style for modern development was much more vigorously strained here than at home. The audacity of the national spirit when dealing with established formulas of design, had free play upon this theme for many years, until often the Gothic ideal was overlaid with such a medley of conceits and inventions that the whole movement seemed to suffer a discouraging *reductio ad absurdum*.

But this pseudo-mediæval era was so extended that many American architects were born, had their professional existence, and died in it, without any knowledge of classic art. Under its influence picturesqueness was substituted for symmetry; playfulness and the affectations of romance, for serious study; taste, for discipline. The literature of the revival was prolific and of an

unusually high grade, admirably adapted to create disciples and proselytes among ingenuous students. In this way arose a school, not disciplined by the training of classic studies, inexact, sentimental, enthusiastic, argumentative, and prejudiced to a degree until then unknown. Its open contempt for the Renaissance created an opposing camp, recruited from those brought up among the academic versions of classic art as taught in the School of Fine Arts at Paris. No two adherents of these embittered schools could meet without a quarrel, and thirty years ago the sessions of the architectural societies resounded with the war-cries of the "battle of the styles," until at length, in the interests of order, it became necessary to make rules effectually barring out the discussion of a topic so inflammatory and so fruitless.

Immediately following this Gothic tempest came the retrogressive movement, begun in England by Mr. Norman Shaw, and known there as "the Queen Anne revival." Its effect upon practice here was prompt and peculiar, especially as regards wooden domestic architecture; but, though not without some points of interest, the movement here was too ephemeral to deserve more than a passing notice. It suffices to say that the "Queen Anne cottage" here wandered very far from its Dutch ancestry. It was a thing of infinite caprice and affectation; its wantonness was amusing, until by repetition it fatigued. It had absolutely no power of progression, and only served to show how transient is the power of a fashion which has no principle of art to sustain it. Its only bond of union was a common purpose to use small panes of glass, to caricature the sunflower, and to degrade systematically certain classic types.

Any account of the architecture of this period in our country would be incomplete without a reference at this point to Mr. Richard Upjohn, of New York, who has been called the father of American architecture, and whose professional career in this country covered the second and third quarters of the present century. His first essays in architecture were made at a time when the art most needed examples of good style, expressed with that soberness and reserve which are the natural result of thorough training and sound, manly common sense. These qualities, which eminently distinguished his abundant work, were the good seed sown in the midst of the exuberant growth of fancy, in which the young art of the nation, when, happily or unhappily, it had broken away from the colonial traditions, first endeavored to express itself. His work, which was mainly in pure archæological Gothic,

served as object-lessons of the greatest value. We are indebted to him for Trinity and St. Thomas, of New York; Grace Church and Christ Church, of Brooklyn; Grace Church, of Providence; St. Paul's, of Buffalo; St. Peter's, of Albany; the Cathedral, at Bangor; St. Paul's, of Baltimore; and numerous other churches, besides secular buildings of every kind in all parts of the country. These were to the American public of the second quarter of the century the first monuments of pure romantic style known to their experience; and, notwithstanding our notable advance in historical knowledge and æsthetics and in the experience of art during the third and last quarter of the century, most of them have not lost their power to teach, and none of them have lost that expression of dignity and propriety which belongs to all true and honest work in art. He did more in his day than any other one man to awaken a fraternal feeling in the profession, and to break through the isolation created by that mutual jealousy and unreasoning distrust which unhappily divided the architects of that time and prevented them from enjoying the fruits of united and harmonious action. He died in 1878.

In the year 1857, in the city of New York, a few architects, persuaded that each had much to learn from the others, and that the professional isolation to which I have just referred was delaying very materially the healthy progress of architecture in this country, came together and formed the first architectural society on the continent. In 1866 this society was reorganized under the name of the American Institute of Architects, Mr. Upjohn being its first president. It immediately began to exercise a potent influence for good not only over the profession but over architecture itself. The second article of its constitution sets forth that its objects are "to unite in fellowship the architects of this continent, and to combine their efforts so as to promote the artistic, scientific, and practical efficiency of the profession." To that end it established chapters or branches in all the principal cities of the East. The Western Association of Architects, with its chapters formed in the Western cities, united with the Institute in 1890. Each of these chapters has a stated monthly meeting, and there is an annual convention of the national body. This organization has already tended directly and indirectly to raise the standard of the profession, to prompt a large amount of active and fruitful work, to abolish the narrowness engendered by the strife between opposing schools, to create an important spirit of professional fellowship, and to encourage a higher culture. It has also been

the means of securing from the public and from the courts a much more respectful consideration for architecture and for those who practice it than they had before enjoyed, and it has obtained and is obtaining important State and municipal legislation for the improvement of building laws and national legislation for the better management of the national interests in the art.

Another and even more powerful influence for architectural reform was the establishment of architectural schools. Until the beginning of the last quarter of the century education in architecture was obtained only by very infrequent study and travel abroad, or more commonly by such observation of practice in offices as could be obtained by service as draughtsman or apprentice. The first school was established by the generosity and public spirit of Richard M. Hunt, the third President of the Institute. Several young men of education, who desired better and more liberal instruction in architecture than could be obtained in the usual way, applied to him to receive them as students. In his methods of instruction he followed the ancient traditions of the French School of Fine Arts, of which he was one of the earliest American graduates. By his vigorous personal qualities, which in themselves were an inspiration, he succeeded in imparting to his fortunate pupils a spark of his own indomitable enthusiasm, and, with the potent aid of his superb library, in planting most prolific seeds of generous culture. His instruction had all the best results to be obtained from classic training; though his pupils were few, their pupils have been many, and the good influence has spread abroad like Wycliffe's dust.

Since then the architectural school of the Massachusetts Institute of Technology, under Prof. Chandler, that of Columbia College, New York, under Prof. W. R. Ware, that of Cornell University, under Prof. Babcock, and several others, especially in Western colleges, have been successfully established. It is no longer necessary for the young American aspirant to seek the magnificent hospitality of the French school at Paris. The curriculum of instruction has broadened and deepened with experience in our own schools, and it is now admirably adjusted to the exigencies of architecture in America. It is impossible to exaggerate the good effect these wisely endowed establishments have had on the practice of architecture here. The development of this art is no longer at the mercy of half-instructed practitioners, for every graduate of these schools elevates architecture to a higher plane wherever he may plant his standard. Indeed, to

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Machinery Hall, World's Columbian Exposition.

this liberal training the future of our architecture may be frankly intrusted to direct our irrepressible energy into profitable channels, and to make the best use of those qualities of individuality which belong naturally to the soil.

Civilization is advancing into the wilderness of the great West like a brimming and irresistible tide which knows no ebb. Its first waves of occupation bear upon their crests a human element of astonishing energy and force. No conquest or crusade of history has been accomplished with a greater display of hardy intelligence. In certain cases it has planted cities and established civil order upon virgin soil in less than thirty days. The external aspects of these first occupations are remarkable for the skill, directness, and economy with which means are adapted to ends. The first settlers are sometimes comfortably housed in a week, so that all the processes of simple social life are made possible without delay. Structures to accommodate the land office, the saloon, the variety store, the railway station, the bank, the school, and the church arise to meet the emergencies of border life, and the visible town is begun. These structures, of course, have value only as temporary makeshifts; but as material prosperity increases, and with it the ambition for permanent investments, the way is open for a much more definite expression of thought in building. At this stage of development the natural desire of every citizen to own property of the best possible appearance at the lowest possible cost leads to what may be called an architecture of pretense—an architecture intended to appear better than it is. This architecture, or more properly this method of building, has, without essential local characteristics, spread over the territory of the West. It has met for many years, and will meet probably for many more, all the practical requirements, and has flattered the crude artistic aspirations of millions of intelligent and exceptionally ingenious and prosperous people. It must therefore be respectfully considered as at present the vernacular art of the country, though when judged by the most liberal and catholic canons of educated taste it fails, in its present if not in its possible conditions, to satisfy the critic. Nowhere else in the civilized world can be found anything resembling it. It is peculiar; it is ours.

I have called this characteristic and almost universal expression of Western civilization an architecture of pretense, because of its ambition and its desire to make a vain show with small

means. No other people in the world so well understands cheap construction and economical methods of building, and is so inventive in providing for it. But unwilling to let it appear what it is, and to let it grow into a legitimate expression of art by natural processes of development, it has been forced to assume forms which do not belong to it, which contradict its proper functions, and which are used to satisfy false and unsettled ideals of beauty and fitness. The facility with which wood and galvanized iron may be molded, painted, and sanded to imitate stone or other nobler materials; the ease with which metals and various compounds may be stamped, cast, or otherwise put through a machine to imitate carving, make this baleful process possible, and tempt the builder to mask his honest work with crude travesties of conventional art.

By contrast with the established, slowly growing, indigenous styles of the Old World, it can not be doubted that the fantastic modes of building in the West, where there are absolutely no inherited traditions, no customs rooted to the soil to keep the architecture in a reasonable path of development, is merely provisional, a feverish expression of transition, a groping after a natural expression in art. It is carelessly compounded of exoteric and heterogeneous elements, and so far as its decorative or architectural character is concerned it has no basis in the essential conditions of the people. The very fecundity of undisciplined and misapplied invention which makes it what it is; the distortion and exaggeration of conventional forms of architecture, which convert some of its productions into a grotesque caricature of art; the fact that none of these experiments give such permanent satisfaction as to cause their repetition, but that they are succeeded by new experiments of illiterate fancy—these things indicate very clearly to my mind that the necessity for a more orderly system of forms, capable of natural growth and expansion, is unconsciously felt. A reign of caprice in architecture, with frequent new departures, may be accepted, *prima facie*, as proof of the need of such a system, in order that the civilization of the time may express itself in a copious language of its own, instead of using dumb signs and gestures or trying to find quotations from other tongues and adapting them to its use.

In the absence of such a natural language, by which all the ideas which are to be expressed in building may be expressed at least grammatically without the need of especial training in art, architecture is completely at the mercy of architects. When they

happen to be men of education, as we shall presently see, there is an astonishing activity in the development of legitimate style. When, as is often the case, they are not educated, this process of natural evolution is very much embarrassed if not entirely interrupted. It is pathetic to see towns of thirty to fifty thousand energetic, public-spirited, intelligent, enterprising inhabitants, with factories, schoolhouses, libraries, churches, public halls, convenient dwellings, and all the external signs of prosperity, but without a single building really good, grammatically constructed, or conceived in a spirit of subordination to any type of art. The people are not indifferent to this state of things. They are intelligent enough to recognize a good work of architecture when they see it, and, as a general rule, their judgment encourages good things. Never has the missionary of art had such a fruitful field for his labors. A good piece of architecture planted in such a town is like the preaching of a gospel of truth among an eager and sympathetic people. It bears its legitimate fruit with amazing promptness. In a twelvemonth there will be fifty imitations. It gives a distinct stimulus to architectural life. Details of design taken from the new model may be seen, copied with various degrees of fidelity, on every hand. It proves to be not only a source of pride to the citizens and a most grateful enlargement of the resources of the builder, but to a great extent a correction and rebuke of prevailing errors. Of course, not one or two or even a dozen good models are sufficient to obliterate all the evils of architectural illiteracy and inexperience in a given locality. A free and unrestricted foraging by undisciplined practitioners among the commonplaces of architecture has made them bad agents of reform. It has created a singular disrespect for all the safe and conservative elements in design, an unwholesome ambition to inject an undue amount of their own personality into architectural work; and when they instinctively recognize a piece of sound construction expressed in an artistic manner, they are prepared only to imitate some of its exterior aspects, not its essential spirit, which alone can fructify.

I believe I am justified in stating that what, for the want of a more convenient name, I have called the vernacular of the country—that which accompanies the first advances of civilization into the new lands and lingers long after the successful establishment of all the institutions of civil order and prosperity—will not be recognized in the future history of American architecture; much less, that it will be stigmatized as a reproach. In fact, it is merely

preliminary to architecture, though for the moment it pretends to be the real thing. It is evidently a hasty growth out of the immediate necessities of an enterprising people too busy with the practical problems of life and the absorbing question of daily bread to have established ideals of art, or to have deliberately formulated in building an adequate expression of their civilization. It is an art whose essential characteristics have been derived from expediency, an art which has been mainly concerned with mechanical devices for quick and economical building. These devices have been invented by practical men to meet practical wants in a practical way. When freed from the misleading adornments imposed upon them by ignorance and pretense; from shams of wood, galvanized iron, machine-made moldings, stamped carvings, and all other delusive rubbish of cheap deceit, which have no connection whatever with the structure, these practical devices will develop style. Until these quips and cranks of undisciplined imaginations shall have descended into their inevitable oblivion, and have been replaced by methods of decoration developed out of the construction according to the spirit of precedents furnished by the best eras of art which remain to us for our delight and instruction, deliberate and permanent architecture will not come into existence.

Upon this simple proposition rests the hope of architecture not only in the West but in the more developed East.

Chicago seems to have fairly won the distinction of being the fountain-head of architectural reform in the West, though Minneapolis, St. Paul, St. Louis, and other large cities may sometimes feel disposed to dispute this title with noble emulation. The healthy impulses from this active and intelligent center are felt in the remotest towns as soon as opportunities have occurred for permanent improvements. The dangerous liberty which the entire absence of schools, traditions, precedents, and consequently of discipline in art has conferred upon the architects of the New World, and more especially of the West, and which has given rise to all the crudeness and vulgarity of our vernacular building, has proved, in the hands of a few well-trained men, in Chicago especially, a professional privilege of the most conspicuous importance—a privilege, indeed, which has not been enjoyed to the same extent in any other city in the world. The resistless enterprise and public spirit of the Western metropolis, its great accumulations of capital, the phenomenal growth of its commercial and social institutions, and the intelligent ambition of its people

to achieve a distinctive position in all the arts of civilization, have given abundant opportunity for monumental expressions in architecture. The manner in which these opportunities have been used during the past eight or ten years gives encouragement to the hope so long cherished that we may at last have an American architecture, the unforced and natural growth of our independent position in art.

To the task of converting into architecture systems of construction which, under the impulse of irrepressible and sleepless energy, are in a condition of constant and active development, inspiration and ingenuity alone are inadequate. The conditions of architecture in this country are so complex that without a thorough training in construction, and in design as the essential expression of construction—design based upon a familiar appreciation of the history of art—inspiration is speechless and ingenuity baffled.

The high function of education in developing style in this country is thus completely justified both in theory and in practice.

The opportunities afforded by the West to architecture on the high plane which I have endeavored to describe are mainly commercial. It is in making the wisest use of these that the leading architects of Chicago have achieved their characteristic successes. Commercial and local necessity has dictated to them the problem of constructing buildings ten, fifteen, or even twenty stories high. This is not the choice of the architects, but a demand upon their resources to meet the requirements of the more profitable improvement of real estate under certain conditions. To solve this problem, men brought up in admiration of the principles of Vitruvius, in respect for the examples of Palladio, in veneration for the great monuments of Greece, Rome, and the middle ages, have been forced to break away from the letter of their academic instruction and to work purely in its spirit, to violate all the school formulas, and to enter into a perilous region of invention, wherein art finds itself in a new atmosphere, either to be strangled by science or to achieve new triumphs with its aid. It was soon discovered that the vast weight of the superstructure required such massiveness of foundation in masonry that the basements and lower stories were choked by huge piers which devoured the spaces most needed for occupation and most lucrative for the owners. From this difficulty was evolved the substitution of a system of construction composed entirely of steel, the foundations,

walls, floors, and roof forming a vast cage, put together with hot rivets and bolts, and braced in every direction so as to resist wind pressure and to obtain the utmost rigidity of structure with the smallest possible occupation of valuable areas by piers and the largest possible opportunities for lighting. In fact, the wall was obliterated. The steel beams, girders, columns, and braces which composed this structure, being liable to collapse from the attacks of fire, were entirely enveloped with fire-clay tiles, or with jackets of terra cotta, these forming the integuments of the metal skeleton and the apparent structure. It thus became necessary to violate the great moral rule, inculcated by theorists during the prevalence of the Gothic revival, that architecture must show and not conceal construction, and that the "lamp of truth" must shine upon all the work of the architect's hand.

The Western merchant requires that, for the exhibition of his wares to the passengers on the street, his whole shop front must be one vast window, and that all columns and piers supporting the superstructure must be reduced to a minimum, and if possible abolished altogether. He has good common-sense reasons for his demand on the architect, who, in meeting it, does not hesitate to build his many-storied façade upon a steel girder, stretching the whole width of his front over a gaping void. The school committee, the church committee, the railroad directory, in like manner exact architectural accommodations to the fulfillment of which no honored historic precedent can be of the slightest service. A hundred problems such as these, arising out of new practical and social conditions, present themselves to puzzle and vex the American architect.

In the Old World fewer problems of this sort occur, and when they occur they are not so frankly met, or they are entirely evaded, if the solving of them involves a new departure from consecrated traditions. Considerations such as these are materially assisting the process of differentiating the architecture of America from that of Europe. And at present, whatever difference there may be between the architecture of the East and the West in America itself may be attributed to the fact that the West is a little farther away than the East from the influence of traditions, and is in the habit of meeting these cruel exigencies of practice in a rather more accommodating spirit, thus perhaps inventing more, daring more, and doing more; but the trained graduates of the conservative Eastern schools, when translated to these scenes of ruthless energy and breathless change, are soon acting as leaders in

the front ranks of progress, and doing reform work the like of which is not seen elsewhere on earth.

Easy intercommunication and the successful establishment of professional journals in various parts of the country are tending to create a unity of architecture from Maine to Texas, from Oregon to Florida. The latter have almost entirely supplanted the foreign periodicals of the corresponding class, and consequently the reproduction of the best current work of our own country has become more familiar to our architects, and indeed more interesting to them, because more germane to their uses than anything of the sort to be gleaned from the foreign papers. An example of good building by a clever hand is known in this way to half the continent within a month from the time of its publication, and its characteristics, if they commend themselves, are promptly echoed in fifty different cities.

At the beginning of the last quarter of the present century the architecture of this country began to be affected by an impulse so vigorous, healthy, and stimulating, so different from any which had preceded it, so elastic, that, in the hands of a profession far more accomplished and far better trained than ever before, it seemed to give early promise of results of the first importance in the development of national style. Inasmuch as at the time of the present writing in 1893 this impulse is still felt and over a far wider field of effort, there is strong evidence that the fulfillment of this promise is by no means impossible.

If there are any prevailing characteristics in the best architectural work of the present day in this country, they consist in the free use of heavy Romanesque forms from the south of France, low-browed round arches, stone mullions and transoms, wide-spreading gables, severe sky-lines, apsidal projections, rounded angles, and towers with low, pointed domical roofs; great wealth of carving where the work is rich; a general aspect of heaviness and strength, frequently degenerating into an affectation of rudeness; columns are short and stumpy, and capitals show Byzantine influence; colonnades and arcades of windows are frequent, and all are free from the trammels of classicism. The new fashion has for the moment driven aspiration and lightness as well as precision and correctness out of the market. Important buildings with such features have lately been completed or are under construction in nearly all the large cities of the Union, from Boston to San Francisco. No modern buildings of this sort are to be seen either in France, Germany, or England; for the Romanesque

of to-day in Europe is derived mostly from Norman traditions, and is more or less stiffened by pedantry and straitened by monastic formulas. In fact, we apparently have at last and for the first time a purely American revival of certain ancient forms. There is scarcely a trained architect in this country who is not at the moment more or less attracted toward this especial phase of Romance art.

We have seen that in modern architecture every movement suggesting change in style has started from an archæological revival. At the beginning of every revival there must stand one or more architects of exceptional force and ability to give to the new movement its first impetus, to show how it can be adapted to modern usage, to establish its respectability and success.

The personality which has performed this function in America with reference to Southern Romanesque is one of the most interesting, and perhaps one of the most remarkable, in the history of modern architects. None have had a professional career so distinguished, so exceptional in its characteristics, and so brilliant in its results as that of Henry Hobson Richardson, of Brookline, Mass., a graduate of Harvard and of the School of Fine Arts at Paris, who died in 1886. It would not be difficult to point out single works by some of his professional friends which, in respect of artistic and technical merit, would occupy a rank at least as high as anything from his hand. But it would not be possible to show a succession of works from any other hands exhibiting an individuality so strong, a personal force so imposing, a progress of achievement so steady, a development of genius so harmonious and consistent. Certainly we shall find no career which has made upon the public an impression so marked, none which has had an influence upon the profession so powerful and so widely spread.

The lesson of Richardson's career was conveyed to us mostly in the language of the Romanesque of Auvergne, but with reminiscences from the neighboring provinces of Anjou, Aquitaine, and Provence. He was also largely indebted for detail to the châteaux and old mansions of Normandy. He was fortunate enough to hit upon an undeveloped style, full of capacity, picturesque, romantic; its half-savage strength beguiled by traces of refinement inherited from the luxury of the later Roman Empire. It was a style quite in harmony with the natural habits of his mind, and he was wise enough to resist the temptation to experiment in other styles. It must not be inferred that he was an archæological architect, like Sir Gilbert Scott, whose works were

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Agricultural Building, World's Columbian Exposition.

always correct and learned but dry and prosaic; or like Burgess, whose whole life was a beautiful early Gothic masquerade; or even like Vaudremer, who in his famous church at Montrouge showed how a refined artist could evolve an ideal Romanesque out of the traditions of the Paris studios. And yet no architect ever made a more thorough and conscientious study of his chosen style; he collected all the books, prints, and photographs which bore upon the subject, and personally ransacked all the forgotten byways among the springs of the Loire for examples and details. He saturated himself with the spirit of the unsophisticated builders and stone carvers of southern France who preceded the builder-monks of Cluny and Citeaux; and yet he never permitted his antiquarianism to usurp the high place of his trained artistic genius.

It is because of the almost unexampled proof of the potency of breadth, unity, and simplicity of style that we are indebted to Richardson. These are the qualities which, irrespective of the especial forms which he affected, constitute his greatest claim to recognition as a leader. The benefits of this example may be detected not only in the work of his immediate school of young followers but in the practice of older men in the profession. It is rather from this influence that we have a right to anticipate beneficent results than from his peculiar mannerism in handling his favorite phases of Romanesque. One has but to glance at the innumerable wooden country houses of the cheaper sort which have arisen during the last two or three years to see, even in this homely branch of the art of building, that the day of fatal facility in jig-sawing, machine-made moldings, and "gingerbread work" has gone by, and given place not to antiquarianism or old colonial masquerading but to careful simplicity of outline, to a reserve in matters of detail which, while they make possible any desirable degree of quaintness or picturesqueness of expression, are entirely consistent with convenience, economy, and a display of the best sort of architectural power. We venture the opinion that this wholesome phase in the building art is the direct result of Richardson's example.

As might be expected, he has imitators who travesty his peculiarities of style and affront the civilization of our times with elaborate affectations of savagery and archaic rudeness. These brutalities fortunately find no general acceptance, and will soon be forgotten. Evidence of refinement and study is essential to any work of the nineteenth century; and when these qualities are

made consistent with those nobler qualities which work for strength, simplicity, and life, as we may see in the Chamber of Commerce at Cincinnati, in the library at Woburn, and in the unexecuted studies for the cathedral at Albany, we seem to approach the highest architectural achievements of our time, and to catch a glimpse of the dawning of a new era having its foundations in principles and not in imitations and conventionalities. Possibly the hope of architecture resides largely in a continuation of Richardson's experiments with the Romanesque of Auvergne. The resources of the style and its capacities for development are evidently not exhausted. If it is treated merely as a revival, there is no health in it, and it will presently fail like the other revivals which have preceded it. If it is treated as a basis for true progress, it may be found more fruitful than any other style now available, and the movement may have before it a future entirely beneficial for American art—a future which will assist in differentiating that art from contemporary work on the other side of the Atlantic, and give us at last, perhaps, a marked distinction in style.

It is fortunate that I am enabled to close this imperfect study of American architecture with a reference to its latest, largest, and most national demonstration; for in the buildings of the World's Columbian Exposition at Chicago it had an opportunity to display its resources on a scale never before attempted. This vast undertaking offered to the world a distinct proof that the art in this country has passed the time of its pupilage, and that it is capable of meeting the largest demand ever made upon architecture as a purely decorative art in a sympathetic and adequate manner not only with pure classic but with romantic and picturesque forms, so treated as to reflect at the same time our respect for the past, our confidence in the future, and the innate independence of the national character.

But if the architecture of the White City changed the habitual condescension of foreigners to respect, or even admiration, and successfully presented our claim to be henceforth ranked, in regard to art, as heretofore in regard to all the details of material progress, in the highest grade of civilization, the genius of our people will not be content to be measured even by this high standard. The most important part of this manifestation was distinctly academic. Its greatest function was to serve as an object-lesson to our own people, admonishing them of the value of *discipline* in architecture. There is already evidence that the seed

so planted fell upon fruitful soil. But it will not turn the irresistible current of our progress in this art into classic channels. There will still be in the future as in the past audacious experiments in style, but these will be controlled by a far more critical spirit. The process of differentiation between our own architecture and the contemporary architecture of the Old World will continue to results which no mind can anticipate; but this process will be preserved from many of the errors of the past by the better education of the architects, by their nobler and purer ideals; and I firmly believe that it will be encouraged, encompassed, and corrected by the more intelligent sympathy of the public. If the great architectural event of 1893 has served to conquer the indifference of the people, and to give to architects a higher sense of their responsibility to them, it will have accomplished its noblest work. For this art can not flourish unless it is sustained by popular appreciation; it can not retain this appreciation unless it keeps pace as a fine art with the advance of all the material arts. It can not sleep upon any academic formulas or scholastic ideals. In expressing in terms of purer architecture the characteristics of our progress in the arts of construction, it will also stand historically for the quality of our civilization.

CHAPTER IX.

THE PHYSICAL STATE OF THE AMERICAN PEOPLE.

In considering the material prosperity of a country there is not a little danger that we may overlook the physical condition of the people upon which the stability of the nation depends.

In primitive states of society physical strength and endurance were highly prized, not only as a means of attack and defense, but also as a means of subsistence, by subjugating Nature and overcoming material obstacles. The changes wrought by modern civilization have rendered the service of a fine physique less apparent. Steam, gunpowder, and electricity are now doing the work and fighting the battles of the world, and they have increased the power of man a thousandfold. So weak and diminutive do the physical efforts of a human being seem when compared with these powerful agents, that we have almost ceased to regard physical vigor as one of the factors in human progress. We can not help thinking that this mistaken idea has arisen from the tendency to consider the development of man the means rather than the end of all endeavor.

It is true that the aggregated efforts of the people make the nation, with its myriad of societies, industries, institutions, etc., but the nation thus constituted reacts upon the life and character of its people.

This is a matter which much concerns us, for a government, like any other organized thing in Nature, is dependent ultimately upon the physical condition of its individual units. Let us consider, therefore, some of the physical characteristics of the people that have contributed to the upbuilding of the nation, and in turn see how the progress of civilization and the development of the country has influenced our national physique. The early settlers of this country were mostly hardy and vigorous people, as only persons thus constituted would undertake the trials and difficulties incident to a pioneer life. The experiences which these early people underwent in felling forests, opening up the soil, fighting

Indians, and trying to get a footing in the land tended to develop those who were naturally strong and vigorous, while it cut off at an early period those who were weak and debilitated. The efforts to establish settlements and to meet their varied wants brought into healthy action all the faculties of mind and body, and stored up a rich inheritance of physical vigor for the generations that followed. The experiences of our first settlers have been repeated in modified forms during the past two hundred years.

The vast extent of unoccupied territory embraced by the United States has allured to our shores thousands of immigrants, who have been disciplined in the rough school of a frontier life, and who have bequeathed their acquired hardihood to their descendants. It can not be said, however, that all the immigrants who followed the early colonists were of as good stock as that represented by the first adventurers. The original settlers, especially in New England, Virginia, and the Carolinas, were largely of English descent, who brought with them good constitutions and some means of subsistence through their connection with the parent country. New York and Pennsylvania were first settled by the Dutch or Germans, while the French were the first to plant a colony in the Canadas. These three nationalities gave us the best inheritance of pure stocks that came to us from European countries, because they started from a higher social level than many of the other colonists, and have maintained their supremacy. Some parts of the country are still almost entirely populated by the direct descendants of the early English and German ancestors.

Even the negroes, who were first brought to the States as slaves, represented a much better stock than those which followed later, or than those who were born and reared on our soil. The first importations of African blood were selected for their good physiques and animal vigor, as it was not profitable to bring over cripples, or persons with any marked physical defects.

The immigrants who began to come to America during the middle of the present century represented a much poorer quality of folk physically than those who had preceded them. Many were the feeble and dependent relatives of the more vigorous members of the family which had come here to make a new home for them. Many, not naturally enterprising or energetic, were attracted by the easy methods proffered by the Government of gaining possession of fertile lands, and still many more represented the weaker specimens of the race who had been crowded out by

the commercial struggle at home and came to seek their fortunes in the new country.

This large infusion of foreign blood of an inferior quality has undoubtedly impaired the general physical status of our people. By this assertion I mean that the average physique of the nation is not so good as it would have been if founded entirely upon the original stock implanted here by the early colonists. Notwithstanding the pollution of the original stock by later infusions, so rich is the country in its natural resources, especially in its food products, that up to 1860 our people had not only been able to maintain their physical status when compared with the parental stock, but in many instances foreigners coming to this country in early life had actually surpassed the natives in their birthplaces in their average stature, weight, etc.

The differences in stature, weight, chest girth, etc., of the different nationalities populating our country previous to the late war, also the differences in the measurements of the native-born Americans of the several States, are shown in the table.

* The following table, compiled from Dr. Gould's report, is extracted from the General Account of Kentucky, in Prof. N. S. Shaler's Reports of Progress of the Kentucky Geological Survey, New Series, Frankfort, Ky., 1877, vol. ii, p. 387:

Table of Measurements of American White Men, compiled from Report of Sanitary Commission, made from Measurements of the United States Volunteers during the Civil War. By B. A. Gould.

Nativity.	Mean height.		Mean weight in pounds.	Mean circumference of chest in inches.		Mean circumference around forehead and occiput.	Proportion of tall men in each 100,000.
	Number of men.	Height in inches.		Full inspiration.	After each inspiration		
New England	152,370	67.834	139.39	36.71	34.11	22.02	295
New York, New Jersey, Pennsylvania	273,026	67.529	140.83	37.06	34.38	22.10	237
Ohio, Indiana	220,796	68.169	145.37	37.53	34.95	22.11	486
Michigan, Missouri, Illinois	71,196	67.822	141.78	37.29	34.04	22.19	466
Seaboard slave States			140.99	36.64	34.23	21.93	*600
Kentucky, Tennessee	50,334	68.605	149.85	37.83	35.30	22.32	848
Free States west of Mississippi River	3,811	67.419		37.53	34.84	21.97	184
British maritime provinces	6,320	67.510	143.59	37.13	34.81	22.13	237
Canada	31,698	67.086	141.35	37.14	34.35	22.11	177
England	30,037	66.741	137.61	36.91	34.30	22.16	103
Scotland	7,313	67.258	137.85	37.57	34.69	22.23	178
Ireland	83,128	66.951	139.18	37.54	35.27		84
Germany	89,021	66.660	140.37	37.20	34.74	22.09	106
Scandinavia	6,782	67.337	148.14	38.39	35.37	22.37	221

* Slave States, not including Kentucky and Tennessee.

There is no severer test of the physical stamina of a people than that imposed upon them during a struggle with arms. The success of an army is so dependent upon the bodily condition of its men, that, in summing up the essential requisites of the soldier, Napoleon put strength and endurance first and courage second. The examining surgeons are instructed to admit to the service only such men as are sound and vigorous and appear able to stand the trials, hardships, and deprivations incident to the soldier's life. It can not be claimed, therefore, that weaker specimens were selected from one race than from another, as the Government was anxious that all should be equally vigorous and well fitted for the service. The physical qualities which were brought out among the soldiers of different races which composed our volunteer army during the late war attest the leading characteristics which immigrants have contributed to our national physique.

In writing of the physical qualities of these different races it is necessary to allude to many of the mental characteristics of these people, which find their expressions in the form and structure of the body which is often regarded as wholly physical. In so doing I make no apology for quoting liberally from a report by Dr. Roberts Bartholow, Assistant Surgeon, U. S. Army, during the war.*

"The races composing our volunteer army consisted chiefly of American, Celtic, Teutonic, negro, and the mixed Spanish-American of New Mexico. The term American as here used does not mean the American Indian, but the composite of the many different races now inhabiting the continent. Of these races the American stands first in point of endurance displayed, while the other races follow in the order mentioned.

"The physical qualities which fit the American for military service consist not so much in muscular development and height as in toughness of his muscular fiber and the freedom of his tissues from interstitial fat, whereby active and prolonged movements are much facilitated. In active service he fails more frequently from defects in his digestive apparatus and from a phthisical tendency than from a lack of power due to imperfect physical development." The American's strong points which fit him for military service are an intellectual hardihood which ren-

* See, for further information on the general subject, Dr. Bartholow's report on The Various Influences affecting the Physical Endurance, the Power of Resisting Disease, etc., of the Men composing the Volunteer Armies of the United States. Published in Sanitary Memoirs of the War, edited by Austin Flint, M. D., 1867.

ders him superior to fatigue, an easy bearing under defeat, and a buoyant self-confidence which misfortunes do not easily depress.

"The Celtic races possess similar qualities, and in respect of merely physical development are not unequal to the American, but they have less tenacity of purpose and mental hardihood. As mercenary soldiers they did not exhibit the same zeal, energy, and power of endurance. They submitted with less patience than the Americans to the requirements of discipline, were frequently turbulent under hardships, and given to complaints about the rations and fatigue duties.

"The German element of the volunteer army did not equal the American or Celtic in the physical capacity for military service. There are certain defects of structure, common in a greater or less extent to all Germans, which impair their powers of endurance—a predominance of the lymphatic temperament; unusual weakness of the abdominal muscles, flatness of the feet, and a tendency to a varicose condition of the veins of the inferior extremities.

"The German carries into the military service many of the mental and moral qualities for which he is most conspicuous in civil life, namely, thrift, fondness for good living, and a love of ease and enjoyment. The first inclines him to serve for hire and to make the most of his opportunities for emolument; the second produces discontent, and even unfits him for service when the rations are deficient; and the third renders him restive under hardships and exposure.

"The negro possesses many of the physical qualities pertaining to the highest type of the soldier: sufficient height, a due correspondence between height and weight, ample thorax, and considerable power of endurance. His chief physical defects are small, ill-developed calves and bad feet, and a proneness to disease, especially of the pulmonary organs. Having the faculty of imitation highly developed, and being fond of the exterior show and parade of military life, he readily becomes an adept in the mechanical training of the soldier. The negro soldier is unquestionably less enduring than the white soldier; less active, vigilant, and enterprising, and more given to malingering. The mulatto is feebler than the negro, invariably scrofulous, and more frequently the subject of pulmonary disease.

"The mixed race of New Mexico is inferior to the negro. Of three regiments raised in New Mexico at the beginning of the

war, scarcely one fifth were fitted for service. . . . They are cowardly, unreliable, and difficult to control in consequence of a very mercurial temperament."

In commenting still further on the physical conditions most favorable to military service, the same authority says, in regard to the effect of previous occupation upon the physical health:

"Those who pursue sedentary trades, who live much indoors, or who are exposed in the course of their business and pursuits to crowd-poisoning, or to vitiated air from any cause, are by no means so well fitted for military service as those whose employments require them to spend much time in the open air, especially in the open air of the country. Hence farmers, lumbermen, and railroad men are better prepared to endure the hardships of a soldier's life than clerks, weavers, shoemakers, etc."

The physical conditions of the country, embraced by climate, soil, water, etc., have not changed much since 1860, and the opportunities for good nurture are perhaps better now than they were prior to that period. It may be seriously questioned, however, whether the changes that have taken place in the social and business aspect of our national life since the war are not going to have a deleterious influence upon the physical stamina and constitutions of our people.

We have seen how the rough experiences of a pioneer life tested the fiber of our early settlers, and we have also seen how the hardships and deprivations of a national conflict at arms tried the mettle and endurance of the generation now passing away; but we can not so readily detect the influences of our present mode of life, because they are less apparent to the casual observer. For this reason it is the more worth while to trace the genesis of the social changes and conditions that are absorbing the energies and affecting the character of our people because it serves to illustrate the general truth inculcated by Herbert Spencer, that "the indirect and unforeseen results of any cause affecting a society are frequently, if not habitually, greater and more important than the direct and foreseen results."

The general introduction of steam and electricity into all the affairs of life has undoubtedly stimulated human activity throughout the world. These agents have brought all communities and nations into close relations with one another, and greatly intensified the competitive spirit common to all people. Even the final struggle with arms, and the determination of supremacy by war, which was once the ultimate resort of nations, has now

come to play a secondary part in the struggle for national existence.

Thus the struggle in which we are now and must for some time be engaged is an industrial and a commercial one. How to raise the best products, manufacture the best goods, and get them to a market at the lowest price, are the problems which every community and every nation has to solve. To meet the competition growing out of this form of warfare not only implies improved implements and machinery and the best facilities for doing work and carrying on a business, but it also implies another important factor which until recent years seems almost to have escaped attention—that is, the improved physical condition of the individual laborer.

The amount of wealth lost to the community through sickness and inability to work is simply enormous. Unfortunately, no statistics on the subject have been taken in this country, but the physical conditions of the people in England are closely enough allied to our own to enable us to draw instructive conclusions from their data. Sir James Paget, in an address delivered at the International Health Exhibition in London a few years since, made the following statement, viz.:

"I think that we cannot escape from the reasons to believe that we lose in England and Wales, every year, in consequence of sickness, twenty million weeks' work; or, say, as much work as twenty million healthy people would do in a week"; and he adds further: "This is equal to about one fortieth part of the work done in each year by the whole population between fifteen and sixty-five years old."

Reckon this lost service in terms of dollars and cents, and apply it to our own country with its greater number of inhabitants, and we should find that the amount lost annually from what should be the nation's wealth would amount to over two hundred million dollars. If we should attempt to add to this sum the losses from premature death, and the unproductive efforts of those caring for the sick—to say nothing of the loss of personal and domestic happiness which is incomputable—the amount would be so large as in a few years to completely wipe out our national debt.

When we consider that a large amount of this sickness, suffering, and premature death is preventable, our responsibility in the matter is almost overwhelming. Most of the temporary sickness from which our people suffer arises from simply not knowing

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Typical figure, showing tendency of student life—stooping head, flat chest, and emaciated limbs.

Typical figure, showing muscular development of chest and limbs, and large breathing capacity, produced by practice of gymnastics and athletics.

how to live. A little knowledge of personal hygiene would prevent a great deal of it. The diseases due to intemperance and immorality are self-induced, and most of the minor accidents which disable our artisans are due to carelessness.

Were it not a fact that we are constantly making improvement in our efforts to avert the infectious fevers, and the diseases that arise from poor food and filthy surroundings, we might indeed despair of improving the public health as our population increases and the natural conditions of healthy living grow more unfavorable. While the national Government still refuses to recognize the importance of appointing a Commissioner of Public Health, it would seem that the people were not thoroughly alive as to their duty and responsibility of meeting and checking the spread of preventable diseases. Great progress, however, is being made in this direction, and State boards of health and public health associations are extending their influence more widely every year.

As destructive to life as preventable diseases sometimes are, and as great a barrier to the accumulation of wealth, still it must be said that they are not so lasting in their physical effects, or so likely to produce constitutional changes in the race, as diseases which are slower in their progress, and not so easily discovered or prevented.

Undoubtedly certain ages, physical conditions, and living in certain countries, or particular districts in the same country, predispose one to certain diseases. Then, the peculiar nature of a man's occupation or profession renders him more likely to take on certain disordered conditions. This fact was brought out very prominently by the examinations of the drafted men during the late war.*

A careful study of the volume referred to will give one much valuable information as to the conditions that tend to affect the physical status of our people, and help toward formulating some method of checking their deleterious influences. The space allotted to this chapter will only permit me to refer to a few of the facts brought out by these examinations of the drafted men.

It was found from these examinations that the States of Minnesota, Massachusetts, and Vermont furnished the largest ratio of

* See "Statistics, Medical and Anthropological, of the Provost-Marshal-General's Bureau, derived from Records of the Examination for Military Service in the Armies of the United States during the Late War of the Rebellion, of over a Million Recruits, Drafted Men, Substitutes, and Enrolled Men; compiled under the Direction of the Secretary of War, J. H. Baxter, A. M., M. D., Washington, 1875."

men per thousand who were rejected for diseases of the digestive system. The New England States showed the largest ratio of rejections on account of diseases of the respiratory system. Consumption was found most prevalent along the seashore, and least prevalent west of the Mississippi River. Maine, Rhode Island, and Massachusetts contribute the largest percentage of rejections from diseases of the circulatory system, and West Virginia, New Jersey, and Kentucky the smallest. New England again leads in the ratio of men refused on account of diseases of the nervous system, while the men from Iowa, New Jersey, and Missouri seemed to be most free from these disorders. Massachusetts, Maine, and Rhode Island furnished the largest ratio, and West Virginia, New Jersey, District of Columbia, and Ohio furnished the smallest ratio of men exempt from the draft on account of any disease.

The relation of occupation to disease is exhibited by the examination of the drafted men; also very instructive, because it shows the condition of men as they are found in daily life, and is a much better criterion than that furnished by the enlisted men, who may be said to represent a picked class in the community.

The diseases of the digestive system were the most frequent cause for rejection among all classes, the mercantile class—merchants, innkeepers, grocers, clerks, etc.—furnishing the largest number of those exempt from this cause, followed in their order by the professional class—lawyers, clergymen, physicians, teachers, editors, etc.—the skilled workmen, represented by carpenters, painters, masons, blacksmiths, plumbers, etc., and the unskilled laborers, as watchmen, fishermen, farmers, sailors, lumbermen, porters, etc.

The rejection from diseases of the circulatory system, including the heart and blood-vessels, were next in frequency, and from these diseases the largest ratio of rejections were among the professional class, then the mercantile, skilled, and unskilled classes in the order named.

Consumption, the bane of our climate, claims the next largest percentage of rejections. The professional classes were most frequently exempt on account of the presence of this disease, then the mercantile, skilled, and unskilled classes.

Diseases of the nervous system were found most often among the professional classes, then among the unskilled, mercantile, and skilled classes; while disorders of the intellect found the largest number of victims among the unskilled class of workmen, followed

by the professional, skilled, and mercantile class in the order given.

The ratio of men that were rejected from these different classes on account of disease in general was in round numbers 367 per thousand from all occupations, 520 per thousand from the professional class, 479 from the mercantile class, 434 from the skilled, and 348 from the unskilled laborers.

From the professional class the largest ratio of rejections was among the editors, being 739.7 per thousand; then followed the teachers, with 739.5; physicians, 670; clergymen, 664; public officers, 627; dentists, 548; lawyers, 543; architects, 535; and, finally, students at the rate of 328 per thousand.

Among the mercantile class the largest ratio of rejections are credited to the brokers—670 per thousand, then the merchants with 602; the upholsterers have 502, which is the largest ratio of rejections from the skilled laborers, and the iron-workers have 189, which is the least. Among the unskilled workmen the watchmen were the most frequently rejected, their ratio being 697 to the thousand, while sailors, boatmen, firemen, miners, and soldiers furnish the smallest ratio of those rejected from this class on account of disease. Soldiers, presumably those who had been in the regular service and passed previous examinations, were credited with 183 per thousand, which is the smallest ratio of exemption from all the occupations given; though the iron-workers, with a ratio of 189 per thousand, would seem to be better representatives of the class of men engaged in industrial pursuits.

The examinations also brought out some interesting personal facts which are worth recording. It was clearly shown that all diseases were more prevalent among light-complexioned persons, and that those between twenty and twenty-five years of age, and from sixty-three to sixty-nine inches in height, were least affected with disorders that disabled them from military service.

Before attempting to draw any conclusions from these data, which are very valuable on account of the large number of persons examined, it would be necessary to have access to many facts which do not appear to have been brought out by the method pursued. Nevertheless, the observations were so numerous that the law governing the frequency of error may be left to take care of the exceptional cases, and we shall be warranted in accepting the general conclusions that climate, occupation, and social conditions affect the health and vigor of our people.

That over one half of all the persons drafted during the civil

war from the professional class, and over forty-six per cent from the mercantile class, and forty-three per cent from the skilled laborers, should be rejected on account of physical disability and disease, are sad commentaries on our habits and conditions of working and living.

If we inquire into the influence of climate, occupation, etc., upon the rate of mortality, we find that living in certain communities, and engaging in certain occupations under certain conditions, does undoubtedly increase the death-rate.

It is very much to be regretted that some registrar-general has not collected statistics on this subject for the United States as have been gathered by Dr. William Farr for England.*

After reviewing this waste of energy and power from disease and death we naturally ask ourselves, Is it necessary? The individual lives in proportion to the rapidity with which the parts composing his organism dies. The man who is going through a vigorous course of training, in which he is breaking down large quantities of old tissue and replacing it with new material, is much more active and energetic, and capable of doing a greater amount of work, than one in which the molecular death-rate of his organism, so to speak, is not so rapid or extensive. So it may be argued in regard to the life of a community or a nation: it lives in proportion to the activity or the destruction of its individual members.

Where the civilization is the most advanced, business competition the sharpest, and social life the most intense, there will be the greatest activity and destruction of the population, and the greatest demand for new people to take their place. This destructive tendency is admirably illustrated in the life of our large cities, into which individuals enter as into a mighty furnace and are consumed in order to generate the energy and power that move the machinery of the world and insure progress. But the individual, when at his highest state of activity, is in a more or less perilous state of health, and easily lapses into that condi-

* For full information on the effect of occupation on the causation of disease, etc., the reader is referred to a paper on The Hygiene of Occupation, by Dr. Roger S. Tracy, published in Buck's Hygiene and Public Health; Diseases of Modern Life, by Dr. B. W. Richardson, D. Appleton & Co., publishers; and a prize paper on The Preventable Causes of Disease, Injury, and Death in American Manufactories and Workshops, and the Best Means and Appliances for Preventing and Avoiding Them, by George H. Ireland, Springfield, Mass., published by the American Public Health Association. Sold by Dr. Irving A. Watson, secretary, Concord, N. H.

tion of body and mind recognized in the victims of overtraining. Here the breaking down of tissue and waste of substance has been greater than the amount absorbed by the organism, and a lessened amount of work, or a change of conditions, is necessary to restore the equilibrium, or disease will be the inevitable result. So it is with a nation. When it is in its highest state of activity and material prosperity, there is the greatest danger that the destruction of individual life will be greater than Nature can restore. The remedy must come in the way of something that lessens the demands on the energy of the individual, changes the conditions under which he lives and works, or improves the nature and quality of his being.

The Americans undoubtedly work under a greater stimulus than any other people. The very atmosphere in the Northern part of the country incites men to activity, and makes them more nervous and energetic. The influence of our free institutions, the absence of class distinction and restraints, the possibility of making a fortune, or of attaining power and fame in some direction, all contribute their share in spurring our people on to great mental and physical efforts. Add to these exciting causes the direct effect of the telegraph, daily press, and means of rapid transit, that not only bring us into immediate communication with our neighbors, but with the whole civilized world, and we begin to see that the strain upon the brain and nervous system is much greater than that imposed upon any other people. The question is, Can we stand it?

Within the past century our people have come to exhibit peculiar habits of mind and body, which foreigners term American nervousness. Brain and nerve diseases are on the increase, and many common troubles of mind and body, which make life miserable to many persons, undoubtedly arise from a lack of sufficient nerve force. Under this great strain of living with our present conditions and environments, thousands upon thousands will perish in their efforts to keep up with the pace of the age and adapt themselves to the circumstances presented. Still, it is encouraging to note that even under this great stress of living we are more than holding our own against the ravages of death and disease.

A large and growing proportion of our population, especially in the Eastern cities, are beginning to adapt themselves to the new environments, and are improving their habits of living. There is much less of the rush and fury of business than there was ten or

twenty years ago. Men go to their work later and leave earlier. Certain hours in the day are set apart for recreation; there are more holidays than there formerly were, and a longer time is given to summer vacations. Our people have much better food than their ancestors, and take much more time to prepare it and eat it. Our clothing is better adapted to the needs of the system, and is worn in a manner less injurious to health, than in former years. Our dwellings and business houses are better heated and ventilated than they were in the early part of this century, and all the sanitary arrangements, embraced under the head of plumbing, draining, and sewerage, have been much improved during the past few years. The accidents and diseases due to certain trades and industries have been greatly lessened by the improved conditions under which they are carried on. Capitalists have learned that it actually pays to look after the health and comfort of those in their employ; hence the sanitary improvements in workshops, warehouses, and all kinds of manufacturing establishments.

Even the dwelling houses of the poor, their schools, churches, and places for social gatherings, often have all the modern conveniences, and many of them are looked after with as much care from a sanitary point of view as the more pretentious residences of the wealthy classes.

Public commons, parks, and gardens are being opened up and laid out in our large cities, and these open-air spaces are doing great service in relieving the danger of crowd-poisoning, which is so disastrous to certain classes of our urban population.

Under the combined influence of all these measures for the improvement of the health and comfort of the people, it is not surprising that the death-rate in many cities has been perceptibly reduced, and the average age of life increased one or two years.

As the evils which tend to destroy life or impair its usefulness are also on the increase, much more remains for us to do in order to fortify ourselves against them. A great deal can be done along the lines where reforms have already begun. We still need to improve the conditions of city life, to get rid of its accumulative filth, and to lessen the amount of its unnecessary noise. We need to relieve weary brains and irritable nerves of the jarring effect of walking and riding over rough pavements, and the sudden starting and stopping of elevators and street cars. We still want better means of heating and ventilating city houses; and much could be gained for health in the warm season if rear yards and roof spaces were utilized for living purposes.

The country, however, is the place to live, not only for its better air but also for its change of scene, that relieves the tension upon eyes and ears, stops the unconscious wear and tear upon nerves and brain, and gives one an opportunity to recuperate his forces for the work in the city during the day.

More perfect means of rapid transit in and out of the city is the great need of our times. The tendency of the people to herd in masses and to collect in the great centers of trade and industry can only be relieved of its evil effects by increasing the means of communication with the country, and encouraging people to go there to live and bring up their children. The sum of these improvements in the manner of living and working, as trifling as they may seem, would soon produce improvements in the health and vigor of our people. But after everything has been done to better the environment and external surroundings, there will still be a large proportion of the race who will fail to maintain a footing in the world for want of a better internal structure.

So rapid has been the development of the arts and sciences, with their new inventions, new methods, new processes, etc., that the human organism, as it exists in many families, has not yet had time to adapt itself to the new conditions imposed upon it. Hence the peculiar susceptibility to certain weaknesses and diseases that characterize different families and follow the pursuit of certain occupations. Again, the division of labor, while it has increased skill and efficiency and added greatly to the total product of human industry, has robbed man of its beneficent influence as a means of general development. It is possible for one to earn a livelihood by the use of a very few muscles or faculties. Many men spend their lives in polishing knife-blades, or other similarly limited work.

Where once a man's occupation kept him in good health, he now has to give what health he has to his occupation, and trust to other resources to make up the deficiency. As a consequence, a large portion of our population never use half their faculties, and if they pursue the same employment for a term of years they are apt to acquire defects of structure, if not of constitution and character, that are transmitted to the next generation. Thus we have going on in our midst a process of physical deterioration resulting from the over-use of a few faculties and the under-use of the rest. A sort of local starvation is taking place for want not so much of plenty of food but of proper distribution of that

food throughout the whole organism, which is one of the provinces of active labor to bring about.

There are thousands upon thousands of people earning their daily bread who never have occasion in their occupation to use the muscles of the upper part of their body. Few ever have occasion to raise their shoulders or to lift their arms above their heads. Yet it is difficult to see how the vital processes of respiration and circulation can be well carried on without the frequent use of the muscles about these regions. If one would know how much this local starvation of the body costs when accompanied by unfavorable external environments, it may be stated that the difference in the physical status of the best Scotch agricultural population and the manufacturing population of the cities of Sheffield and Bristol, in England, is an average of five inches in height and thirty-one pounds in weight in favor of the farmers.

This difference in stature and weight is not confined to the farmers and those who work in the factories. The English Anthropometrical Association showed by their investigations that growth and development receive a check as we descend lower and lower in the social scale, and that a difference of five inches exists between the average statures of the best and worst nurtured classes of children of corresponding ages, and three and a half inches in adults. Yet the political economists tell us that the deficiencies of occupation due to the division of labor, and the want of suitable environments to work and live in, are made up by the training of our schools, the establishment of parks and playgrounds, free reading rooms, libraries, concerts, etc. These are all very well in a way, and are doing much to educate and enlighten the masses; but the one thing that our people need above all others to enable them to meet the demands of civilization, is a thorough system of physical education.

Happily for us, the country is just awakening to the importance of this subject, and is putting forth efforts in several directions toward the attainment of better physiques among our population. The principal lines along which this interest in physical training has been developing are represented by our universities, colleges, and secondary schools, our Christian Associations and social and industrial unions, and our city athletic clubs. How this interest has grown within the past twelve years may be judged by the following list of institutions that have built gymnasiums, or reconstructed halls or other buildings for the practice

Gymnasium, Yale University.

Pratt Gymnasium, Amherst College.

of physical exercises, and equipped them with the Sargent system of developing apparatus.

Number of Gymnasiums equipped, according to Institutions.

Universities	29	Reformatories	2
Colleges	49	Young Men's Christian Associations	261
Government schools	3	Other similar institutions	21
Theological "	4	Athletic clubs	54
Medical "	2	Armories	12
Normal "	15	Sanatory, etc	13
Academies, etc	60	Private	20
Seminaries, etc	27	Turnvereins	3
Asylums, etc	26	Open air	2

How many institutions have built gymnasiums and furnished them with other systems of apparatus the writer is not able to determine. It is estimated, however, by Dr. E. M. Hartwell—who made a report for the Bureau of Education on Physical Training in the United States—that the list of institutions referred to comprise about seven tenths of all those that have equipped gymnasiums during the past decade.

The table given below shows in what States and parts of the country this revival of interest in physical training, as represented by the building movement, has been most prominent.

Number of Gymnasiums equipped, according to States and Countries.

Alabama	6	Nebraska	2
Arkansas	4	New Hampshire	7
California	16	New Jersey	22
Colorado	3	New York	100
Connecticut	22	North Carolina	12
Delaware	2	Ohio	27
District of Columbia	7	Pennsylvania	72
Florida	2	Rhode Island	16
Georgia	10	South Carolina	4
Illinois	14	Tennessee	18
Indiana	13	Texas	2
Iowa	4	Utah	1
Kansas	6	Vermont	6
Kentucky	3	Virginia	15
Louisiana	5	Washington	2
Maine	12	West Virginia	1
Maryland	27	Wisconsin	9
Massachusetts	75	West Indies	2
Michigan	16	Mexico	1
Minnesota	4	Canada	16
Mississippi	1	England	3
Missouri	11	Australia	1
Montana	1		

The amount of capital invested in the construction and equipment of these gymnasiums it is difficult to estimate, as part of the property is used for other purposes. Twenty-five of the principal athletic clubs own property valued at five million dollars and upward, while two of our largest universities have gymnasiums whose combined cost was over three hundred and fifty thousand dollars. Many hospitals, asylums, and private retreats for the feeble-minded and insane have added gymnasiums to their premises, and many private citizens have had rooms in their houses fitted up with gymnastic apparatus.

Perhaps the best indication of true progress in this direction is the step taken by the Park Commissioners of Boston, Mass., in establishing two open-air gymnasiums in connection with the park system of that city. One of these gymnasiums is for the use of men and boys, and the other is for women and girls. Both are open, free of charge, furnished with trained instructors and assistants, and during the warm season are very largely attended.

During the past fifteen years great interest has also been awakened in field sports and track athletics. Most of our colleges and schools have their regular playgrounds, and many of them have graded fields and running tracks, which have been constructed at considerable expense. Nearly all of the city athletic clubs have grounds where their athletes practice running, jumping, and like sports; and the Christian Associations throughout the land are making efforts to secure similar facilities for the practice of open-air games among their members.

The great games of football and baseball have really become national in the breadth of interest they have awakened. The annual contests between the football teams representing Harvard, Princeton and Yale Universities frequently draw twenty to forty thousand people from different parts of the country to witness the match that is to decide the championship for the season. The attention given to all sorts of physical exercises, including bicycling, tennis, boxing, rowing, bowling, canoeing, yachting, etc., has greatly increased during the last decade, and at the present time it shows no sign of abating.

The records kept at the Hemenway Gymnasium, Harvard University, give some basis for formulating opinions as to the probable effect of physical exercise upon the physical powers of our youth. In the year 1880, when the new gymnasium was first opened, nearly all the students then in college (about 1,000) were measured and examined physically, and most of them were

tested as to the strength of their arms, backs, legs, chests, etc. The highest total attained at this time was 675.2 points. In 1884 the highest total was 1272.8 points, and in 1890 there were over 250 men on the books, out of a total of 4,000 examinations, whose total number of points was higher than the highest man in 1880. When it is considered that strength is to a certain extent synonymous with health, and surely a measure of power, the changes produced in the organism that can show such results are indeed gratifying.

Another illustration will serve to show great gains in other directions.

In the trophy room of this same gymnasium there are a number of tablets commemorating the performances of the young men who establish a record in any athletic event. In 1875, soon after the Harvard Athletic Association was started, the quickest time that any member made that year in running one quarter of a mile was sixty seconds.* At the present time there are connected with Harvard University at least one hundred students who can run a quarter of a mile inside of sixty seconds. Here is a decided gain in agility, which means improvement in structure and increase in organic power, due to systematic training. This illustration only shows the advancement that has taken place along one line of sport; but the advancement has been marked and decided in all exercises requiring skill, strength, endurance, and agility.

It is fair to presume that the improvements that are taking place in the physique of the students at Harvard are going on among the students of other colleges and the members of the Christian Associations and athletic clubs.

It is a physiological law, that increased use of a part improves unction, and improved function improves the structure. This being true, we should soon begin to see signs of physical superiority in the physique of our American people. There is one very prominent factor, however, in our method of practicing and conducting athletic exercises, that will tend to lessen the good we shall get from them, if not to make them eventually sources of evil. I refer to the tendency in all our colleges and athletic associations to pursue the practice of athletic exercises as *ends* in themselves, rather than as *means* to an end. This introduces the professional spirit into all our sports and pastimes, and robs them of half their value.

* The best college record for running this distance is forty-nine seconds.

It requires a most vigilant supervision of athletics in our large universities to keep these sports within bounds, and to try and have them so managed as to be of the greatest service to the greatest number. Unless the professional spirit is soon checked, the better class of young men will not participate in athletic games and contests, and the athletic clubs of our large cities will be given over to social usages, and become simply the financial backers and supporters of professional athletes. I should regard such an ending to such an important movement as little less than a national calamity. We need all our sports and games, and we should conduct them in such a way as to induce a greater and ever-increasing number of our youth and young men to participate in them. The kind of "professionalism" in athletics that the country is most in need of is a large body of well-educated professional teachers.

There is a great demand for vigorous young men who are not only expert performers in athletic exercises, but possessed of a good education—young men who shall have been specially trained in anatomy, physiology, and personal hygiene; who shall be familiar with anthropology, anthropometry, and the history of physical education; who shall know how to make physical examinations and diagnoses, and how to prescribe suitable exercises for different individuals, etc. If the young men so trained have been able to supplement their special knowledge with a college education and a medical-school training, they will indeed be in an advanced position, and well able to render valuable service to the country in maintaining the health of her youth, and teaching them how to grow strong and vigorous.

Perhaps the most important step that has yet been effected toward preparing young men for such positions of public service is that recently taken by Harvard University in establishing a four years' course at the Lawrence Scientific School in anatomy, physiology, and physical training. This course will embrace a very wide range of study and practical instruction in a great variety of athletic sports and gymnasium exercises. Upon its successful completion the student will receive a diploma of S. B., and be entitled to all the privileges and distinctions of graduates from other departments of the school.

A summer course in physical training is also conducted at Harvard University for the benefit of the large body of pupils and teachers of both sexes who are engaged in other duties during the year. Some four or five hundred men and women have

already availed themselves of this opportunity to take the summer-school instruction in physical training at Harvard, and are now engaged in teaching physical exercises and correct habits of living in schools, colleges, athletic clubs, and Christian Associations throughout the land.

The reader may say, This artificial system of physical training is all very well where gymnasia abound and well-qualified teachers are employed to direct them, but what can be done for the physical improvement of the masses to whom these opportunities are not available?

Unfortunately for the advancement of the race, this question can be applied with almost equal force to the mental and moral improvement of a large portion of our people. The churches, schoolhouses, and libraries do not reach all the members of a community, and the problem is, how to make the influence of these institutions felt among that class where it is most needed. Here the best results are accomplished by arousing an interest on the part of the individual in himself. So it is with physical training. When once a man has become thoroughly convinced of its importance to his own physical well-being, half the battle is won, and henceforth his life may be so ordered that even his daily labor will be made to contribute to his personal improvement. The writer recalls his own experiences as a boy in this direction. Having become interested in the laws of health through reading a school physiology, and being deprived by circumstances of an opportunity to cultivate the body systematically, he resolved to make his labor contribute to the development of his physique.

Henceforth, going up and down stairs was simply a means of strengthening the muscles of the legs. Lifting weights and bearing burdens were approved ways of developing the muscles of the back and loins and strengthening the arms and shoulders. Plowing, mowing, raking, pitching, hoeing, chopping, digging, hoisting, and all the diversified forms of labor that fall to the lot of the country boy, were classified according to their specific effect in developing certain muscles of the body, and were entered upon with something of the same zest that one would engage in a course of systematic exercise. The proud consciousness that I was improving my physique and adding to my strength and vigor lightened the burden of labor, and afforded me much greater satisfaction than the small pittance that I received for my services. I can not help thinking that many a young man who can not enjoy the privileges of athletic clubs and

gymnasiums still has it in his power to do much to improve his physique. The idea that the work that one engages in must be necessarily interesting in itself in order to be beneficial is erroneous. It is true that one is more likely to enter with energy and enthusiasm into the work he is interested in, but if one gives his physical efforts his attention, whether it be at work pounding iron on a blacksmith's anvil or driving stakes for amusement, the benefit will be in proportion to the muscles exercised and the effort made, provided this activity is kept within the physiological limits.

No one can say that pulling chest weights is interesting, and yet the man who has sufficient character to use these developing appliances regularly and systematically derives an immense amount of good from them. As a matter of fact, some of the most prominent athletes in our colleges and city gymnasiums laid the foundation for their strength and agility while doing farm work or engaging in industrial occupations or mechanical pursuits. It is the kind of efforts that one makes hundreds of times a day that affects the constitution most favorably or unfavorably, and not the spasmodic efforts that are made once or twice a week. How important it is, therefore, that the simple matter of attitude or position at work should receive careful attention! A faulty position while standing or sitting not only cramps the vital organs and interferes with the important functions of respiration, circulation, and digestion, but also weakens the muscles that are kept almost continually on the stretch during the working hours. This leads to more or less permanent deformity, and is the principal cause of the mishaps so frequently observed among the industrial classes. The only remedy for this defect is to so develop the muscles that are attached to the trunk that they may hold the head and body erect. There is no easier way of accomplishing this object than by repeatedly trying to straighten up and assume an erect attitude while sitting, standing, or walking. Without attempting to give in this paper any specific directions for carrying out a system of physical exercises, it may be well to mention that frequently drawing in full breaths and filling the lungs as completely as possible is one of the very best methods of straightening the spine and preserving the chest from deformities. If the opportunity offers, raising the arms sideways until the backs of the hands touch over the head is a simple yet effective way of developing the muscles that hold the shoulders up and keep them from drooping.

A very good exercise for strengthening the muscles that keep

the body erect on the pelvis is to bend forward and try to touch the toes while keeping the legs straight at the knees. Raise the arms to a perpendicular position over the head, and repeat the movement ten to thirty times a day.* Another important thing to bear in mind is the necessity for frequent changes of position. If one's labor is diversified, this change is brought about by going from one piece of work to another; and where the order can be arranged to suit the needs of the system; it is better to so adjust it that the muscles of the different parts of the body are used alternately. If there is work requiring much standing and walking, let it be followed by work of a sedentary nature, in which the muscles of the arms and back are used. By following this course more work can be done with less fatigue than by using a smaller number of muscles for longer periods. This fact should be borne in mind in choosing exercise for recreation.

If a man has been confined to a chair in an office all day, he could find recreation in a bicycle-ride or an hour's walk in the country. On the other hand, if his labor requires him to be about on his feet from morning until night, walking, running, or bicycle-riding would not be the best form of local exercise, though the change of air and scene might be beneficial to the system. The same reasoning is applicable to the gymnasium. It is not the place for the man who has been handling lumber or heavy articles, or for the man who has been working all day in an iron foundry or rolling mill. The strength acquired by the pursuit of their occupations would at first show well on the apparatus, but after a while the system would become impaired by the double strain, and the gymnasium would be an injury rather than a benefit to this class of attendants. The custom of taking Saturday afternoon for recreation is a good one, and if a young man can have the opportunity to attach himself to a baseball, cricket, or tennis club, he should embrace it. If it is possible to participate in any of these exercises even for a half hour a day, the result would be better than to postpone the opportunity until the end of the week. The custom of putting off all forms of physical recreation until vacation time is foolish and most pernicious. It is almost as senseless as to follow a system of prolonged starvation in hopes of enjoying a brief one of gorging and repletion. I have known a great many persons to injure themselves by their spas-

* For a further list of exercises the reader is referred to Home Gymnastics, by E. Angerstein, M. D., published by Houghton, Mifflin & Co., Boston; and Home Exercises, by D. G. R. Screber, M. D., C. W. Bardeen, publisher, Syracuse, N. Y.

modic efforts to condense the normal exercise of a year into a few weeks in summer, while the system could have been greatly benefited by the physical efforts made during a vacation if these persons had gradually accustomed themselves to muscular activity. The best plan is to regard exercise as one of the important agents of health, and treat it with as much consideration as the subjects of food, sleep, bathing, clothing, etc. Where this is done, one will enjoy all the sports in their season, and will so order his daily life that it shall afford him some form of physical recreation. This is possible to everybody; for, although athletic associations, gymnasium, boat, ball, and other exercise clubs, may not be accessible, still, as long as one is a free man and master of himself, he can do something to improve his physique and help him stand the wear and tear of his occupation. If no other opportunity is afforded, fifteen minutes' exercise, in free movements, which may be taken in one's bedroom night or morning will, if pursued regularly through the year, help to keep a man in good physical condition and fortify him against the incipient forms of disease.

Interior of Hemenway Gymnasium, Harvard University.

CHAPTER X.

POLITICAL ORGANIZATION OF THE UNITED STATES.

When the early colonists from England landed on the Atlantic seaboard and took up local government, they transplanted to our shores such political institutions as they were familiar with at home, and then changed and modified them to suit the conditions of a new country. The simplest and lowest form of local government—the unit, as it is commonly called—passed under a variety of names at different times in the different colonies. Here it was the town, there it was the manor, elsewhere it was the hundred or the riding, the liberties, the parish, the plantation, the county, the shire. Yet the difference was largely in name, for there were, after all, but three distinct forms of local government, and these three were the town, the county, and a combination of the two.

The prototype of each was a local organization in England using powers both temporal and spiritual, and called indiscriminately the town and the parish. The word town did not call up in the minds of the Englishmen of 1600 a mere collection of houses, nor the word parish so many hundred people worshiping at one church, but both; for each was applied to the same parcel of land the dwellers on which had certain prescribed duties to perform and certain rights to maintain, and in general praised God under the roof of the same church. Some of these duties were done by men called parish officers, acting in obedience to by-laws made by a majority of the vestry or parishioners assembled in town meeting. This town meeting, this vestry meeting, this gathering of parishioners was generally held in the nave of the church, and to it the people were summoned by a notice read in the church on Sunday, and then posted in the market place and on the church door, and, not unlikely, were even "warned" to come by the beadle going from door to door.

The spiritual head of the parish was the minister, who presided over the vestry meetings, and was the registrar of births,

deaths, and marriages. The civil head of the parish was the constable, who, charged with the preservation of peace and order, sent forth the hue and cry, and had especial charge of the watch and ward. Next to him in rank were the churchwardens, performing duties sometimes spiritual and sometimes civil, and forming the connecting link between the minister and the constable. They were curators of the church and its property, its ornaments, its vestments, its bells, but not its chancel. As civil officers they fixed the church rate, called the vestry to authorize the levy, were overseers of the poor, spent the poor rate, and, in fine, were the fiscal officers of the parish. Associated with these men in their work was a committee of "assistance," made up of passed or former constables and wardens, whose duty it was between the meetings of the vestrymen to advise the parish officers in the management of affairs. Yet further down came the parish clerk, who was the parson's assistant and kept the record of marriages, births, and deaths; the vestry clerk, who was the parishioners' secretary and kept the minutes of the proceedings of the vestry; the beadle, the hedgewardens, the impounders, the common drivers, and a host of others whose names need not be mentioned.

Such was the English parish as the early colonists knew it and transplanted it to our shores. But hardly was it here when it underwent a great change. The two functions which in England had so long been exercised together began to fall apart, and according as the one or the other was chiefly developed the institutions of the colony were deeply affected. In Virginia, and, as time passed on, in Maryland, in South Carolina, and in Georgia, the civil functions of the parish fell into disuse, the county became the unit of civil government, and the parish degenerated almost entirely into a religious division. In New England, on the other hand, the religious functions of the parish were cast aside, the civil functions were greatly improved, and the parish, under the name of the town, became the unit of civil government.

It is indeed true that when Smith and his followers landed at Jamestown they settled of necessity in stockaded villages which bade fair for a time to retain their character and grow into flourishing and important cities; but the many economic causes which produced plantation rather than village life stopped this growth. The so-called cities fell into decay, the county began to develop, and in 1634 Virginia was cut into eight shires, to be governed, said the law, "in the same manner as the shire in England." In a few years, however, the name of shire was dropped, the

name of county was substituted, and the number gradually increased till, when Jefferson wrote his Notes on Virginia, there were seventy-four.

As then organized, the Virginia county was the most highly centralized form of local government known in America. Over it presided the lieutenant, who sat in the Governor's Council and commanded the militia, and whose duties bore no little resemblance to those of the constable in the English parish. The civil duties of the wardens in the English parish were discharged by the county court, a body of men varying in number, who sat once each month to dispense justice, try cases of petty debt, and oversee all matters of internal concern. It was the county court that fixed the levy, that opened the highways, built the bridges, licensed the inns and taverns, designated the tobacco warehouses and landings, and presented the names of the men from whom the Governor selected the sheriff. As time passed on the courthouse became the center of every interest, and court day all, and more than all, that town meeting and general training were in New England.

The Virginia parish, on the other hand, stripped of so many of the old-time civil functions of its English prototype, became a division of the county for church purposes. As America had neither bishops nor patrons, the Governor took the place of the English ordinary, and the county court that of the visitation. The assistance became the select vestry, which in Virginia usurped the powers of the open vestry or meeting of parishioners, filled its own vacancies, fixed the parish rates, appointed the churchwardens, and presented the minister for induction to the Governor, oversaw the poor, and kept strict watch of the morals of the community.

In New England the reverse of all this took place. The plantation system was unknown. Men settled in communities, built their houses close together, and drew around them stockades for defense against the Indians. They came to America, moreover, not as individuals, nor by families, but as church congregations led on by their favorite pastors, and intent on worshiping God in a manner very different from that required by the Established Church of England. In their settlements, therefore, the religious functions of the parish were lost sight of, and the civil functions were enormously developed; yet the features of the parish were well preserved. Over the town presided a body of selectmen, which was no other than the assistance of the English parish or the

select vestry of the Southern colonies. These selectmen were chosen by town meeting, which was the ancient open vestry or meeting of parishioners, and to it the people were bidden by constable, by lawful warning from house to house, just as in England the beadle summoned the parishioners to attend in the nave of the church. Once gathered in the town hall the people would put a moderator in the chair, and, with the town clerk as secretary of the meeting, pass such orders and enact such by-laws as they saw fit. It was the town meeting that ordered the selectmen to "make a rate" for the list of taxes, that elected town officers, that chose the delegates to the General Court, that regulated the use of the common fields and pastures, and the management of the village herds; authorized the laying out of roads, the employment of ministers and the teachers of schools, and concerned itself with the humblest and most minute details of the daily life of the people.

To execute its will the selectmen were chosen, and were beyond all doubt the most remarkable governing body in the history of man. As administrators of the town finances they fixed its tax rates, bade the constable collect them, and audited his accounts. They brought suit for the recovery of debts and fines, they let contracts for public works, they admitted newcomers to be inhabitants of the town, licensed the victualing houses, repaired the streets and highways, abated nuisances, removed obstructions, established ferries, fixed the price of beer, managed the almshouses, quarantined ships, set idlers to work, bound out the children of the poor, and chose a host of officials too numerous to mention. The New England town, to be short, was a representative democracy of the purest type, nor did it even for a moment lose this character; and when, as time went by and towns multiplied, as chartered colonies were established, and counties were marked out and States were created, the town still remained the unit of constitutional government. It was the town that was represented in the General Court. It was the town that maintained the trainband, the unit of the colonial militia, and it was the unit for the levy of county as well as State taxes.

Between these two extreme forms of local government, the county in the South and the town in the East, there grew up meantime a third form. Following in the track of Henry Hudson, the Dutch thrust themselves in between New England and Virginia, and settled on Long Island, in New Jersey, and in New York, establishing in each such forms of local government as existed in Hol-

land. But the province soon fell a prey to Great Britain, and with English rule came English institutions. The form of local government set up by the Duke of York's laws in 1676 made, it is true, but little change in the government of the Dutch villages. But in 1703 a law was passed which laid the foundation of that system of representative township—county government, which now forms the highest type of local government in our country. By its provisions each town was required to elect annually from among the freeholders two assessors, one collector, and a supervisor, whose duty it was "to compute, ascertain, examine, oversee, and allow the contingent, public, and necessary charges of each county." This has come to be known as the New York plan of local government, which has in our time spread far and wide. It holds a middle place between the Virginia system, where the county overshadows the town, and the New England plan, where the town overrules the county. Under it the town is indeed subordinate to the county; but the subordination is based on representation, for in the county board of supervisors sits one chosen representative of each town.

In Pennsylvania many of the features of the Southern county did indeed exist. There was no lieutenant; but there were a high sheriff, a county court with civil and criminal jurisdiction, with power to lay out roads and precincts, appoint overseers of this and appraisers of that, public proctors and beadles. But the sheriffs, the coroners, the members of the Assembly, and the members of the Council for the county, were all chosen by the freemen assembled before the sheriff and judges of election at the most convenient place in the county and voting by ballot. There were county boards of inspectors of election, but they too were elected by the people of the townships. There were county taxes and public charges; but the men who fixed the charges and assessed the rates were not the judges, as in the South, but county commissioners and county assessors duly elected by the people. In a word, the county government of Virginia was a highly centralized aristocratic government, in which the people had no voice. The county government of Pennsylvania was centralized, but it was centralization resting on popular election.

Thus was it that when the Revolution ended there were firmly established in the seaboard States three distinct forms of local government: the township in the East, the county in the South, the township-county in the Middle States of New York and Penn-

sylvania. But peace had no sooner returned than the western movement of population—a movement which had been going on from the day the first settlers landed on James River, and had been retarded and well-nigh stopped by the war for independence—began again, and went on with astonishing rapidity. For a time there seemed to be nothing peculiar in the movement, but an examination of the first census under the Constitution, taken in 1790, makes clear the fact that the people were moving not in a heterogenous mass but along three highways, which, as census after census was taken, became more and more strongly defined. We now know that the first stream, made up chiefly of men from New England, entered New York, pushed up the Mohawk Valley, and by 1800 had entered northern Ohio. Re-enforced by men from New York, it skirted the shores of the Great Lakes, crossed northern Ohio, Indiana, and Illinois, entered southern Michigan, and in 1850 was peopling Iowa. The second stream, pouring out from the great gathering of people on the Delaware and the Chesapeake, went down the Ohio Valley, settled Kentucky and all southern Indiana and Illinois, and, crossing the Mississippi, made Missouri a State in 1821. The third, drawing largely from the States of North and South Carolina, went over the mountains to the headwaters of the Tennessee, and passed ultimately into the cotton lands of Alabama and Mississippi.

The consequences of this peculiar movement have been most serious and most interesting. Each stream carried with it the manners, customs, mode of thought, and modes of government peculiar to the section whence it came. But as two of them never came in contact, and as the third touched these two only on the edges, it came to pass that in time the forms of local and State government existing in the three sections out of which these streams came were carried across the country and perpetuated in the West.

In the Northwest these institutions were not established without a struggle, in which the great land Ordinance of 1785, and the yet greater Ordinance of Government of 1787 play a chief part. By the Ordinance of 1785 it was ordained that the land should be cut up into townships six miles square. Yet we are told that when this provision was under debate in Congress the South resisted it; that the Southern members, used to indiscriminate locations and settlements, insisted on a rule that would give free scope to the roving immigrant; that the Eastern members, used to their own custom of settling by towns, were eager for the township

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division; that a compromise resulted; that, to please the East, the South agreed to accept the township six miles square; while the East, to please the South, consented that every alternate township should be sold by sections.

The township thus created was indeed but a geographical area without organization; yet, it was the possible area of a future municipal body, and this body the Ordinance of 1787 created, though it did not by any means follow of necessity that the township for purposes of government, and the township for purposes of selling land, must be one and the same. But the Ordinance of 1787 went further, and provided that, till such time as the Territory should have a Legislature, the laws should be established by the Governor and the judges, and that these laws were to consist of such statutes or parts of statutes as were then in force in any of the thirteen States. Just what form of local government should exist in the Territory was, therefore for the Governor and judges to say. The Governor was a Pennsylvanian. The settlers were chiefly from Pennsylvania, Virginia, and Maryland; and under the combined influence of the two the township-county system of Pennsylvania was established, and somewhat modified by Southern influence. When the eastern end of the Northwest Territory was cut off and organized as the Territory of Ohio, the system spread to Indiana; but here, for the time being, it stopped. In 1809 the Territory of Illinois was cut off, and nine years later formed a Constitution and was admitted into the Union as a State. The people were now entirely free to set up such forms of local government as they saw fit, and the influence of immigration began to show. For years past the van of the second great stream of immigrants had been pouring down the Ohio and settling all the lower part of Illinois. The first or New England stream, sweeping along the south shore of the Great Lakes, had in 1818 just reached southeastern Michigan. Not a man from it had as yet entered Illinois which was, therefore, entirely under the influence of men from Virginia, Kentucky, and North Carolina, who adopted and established the county system of Virginia. As time passed, however, the Northern stream, pushing steadily westward, reached Illinois, and filled the northern counties; while the middle stream, traveling westward, went up the Missouri River. Population, as a consequence, did not increase very rapidly in the southern counties, while it did grow rapidly in the northern counties. The State, thus lying across the path of the two streams of people, became a

battle-ground for opposing ideas of local government. For more than twenty years this contest went on, till, in the Constitutional Convention of 1847, it ended in a compromise. Under the new Constitution the Legislature was empowered to pass a general law for the organization of township governments, leaving it for the people of each county to decide by vote whether they would or would not have township government. The Legislature passed the law, and immediately the counties crossed by the Northern line of immigration, voted for township government; but the southern counties did not, and to this day many have not. The township thus created is, save in a few special cases, the six miles square township of the Ordinance of 1785.

Precisely the same struggle has in more recent times taken place in Missouri. That State, lying directly in the line of march taken by the middle stream of population, was settled by men from Virginia, Kentucky, and the southern ends of Indiana and Illinois. In 1820 it became a State, and adopted, as in Illinois, the county system of local government. But at the close of the civil war immigrants from the North and West went into Missouri; a struggle for a change in the form of local government at once arose, which, as in Illinois, ended in a compromise, when the new State Constitution was framed in 1875, and the Assembly was then given power to pass a general law, under which any county may organize township government when a majority of the voters wish it.

In that same year the Illinois system was extended to Nebraska. On its organization as a Territory, in 1854, the county had been adopted as the unit of government, and no change was made by the Constitution of 1867. But in the years following the war thousands of men came in from the States just east, agitation for township government began, and when the new Constitution was made, in 1875, the Illinois plan of county option was adopted.

But it is needless to dwell longer on the detail of the struggle in every State. It is enough to know that when the war for independence ended there were on the Atlantic slope three types of local government; that they existed in three different sections of the country—the East, the Middle, and the South—and that, as population moved due west, these three systems were carried along. The town government of New England, with the town meeting not only for the purpose of electing officers but also for the purpose of enacting by-laws, exists nowhere out of New England, and only in a greatly modified form in Minnesota and the

Dakotas. But from the idea of township government coming in contact with the idea of county government there has resulted a form of township-county government, of which, again, there are two distinct types. That of New York is the higher, and has been introduced into Illinois, into Michigan, into Wisconsin and Nebraska; that of Pennsylvania is the lower type, and exists in Ohio, Indiana, Missouri, Kansas, and Iowa, and in a rude way in California.

In South Carolina, till the civil war, the unit of local government was the parish in the lowlands and the district in the uplands. But elsewhere in the South the county system prevailed.

As there have been three ruling forms of local government, the township and the county and the township-county, so there have been two ruling forms of State government—that of New York north of the rivers Potomac and the Ohio, and that of Virginia to the south of them.

In the confusion which followed the outbreak of the war for independence the colonial governments were swept away. The old Legislative Assemblies refused to meet, the Governors fled from their enraged subjects, and the people, taking matters into their own hands, established governments of their own making. As the dispute was not believed to be one of long duration—for no steps leading directly toward independence had as yet been taken—these new governments were looked on for the time being as makeshifts to serve till the quarrel with the mother country had been settled, and the overthrown governments set up. They were, therefore, of the simplest kind, and consisted of "Provincial Congresses" or "Provincial Conventions," and "Committees of Safety" or "Committees of Correspondence."

The "Provincial Congresses" in the States were in every instance composed of a single House, to which came delegates elected by the people or chosen at mass meetings of citizens, or appointed by the municipal authorities of cities or towns, who exercised all the legislative powers ever enjoyed by the colonial assemblies. The "Committees of Safety" were composed of men elected by the "Provincial Congresses," and were intrusted with all the duties and all the powers of the late colonial governors.

Scarcely had these bodies begun their labors when it became quite clear that reconciliation could not take place; that England would not purchase obedience with compromises or concessions, and that nothing lay before her rebellious subjects but independence or submission. Then there grew up the conviction that

these rude substitutes for regularly established governments were ill suited to the crisis, and that some permanent systems should be speedily adopted. One by one, therefore, after 1775, the colonies began to apply to the Continental Congress, then sitting at Philadelphia, for advice. Naturally enough, the first application came from Massachusetts, for she was at that moment the most harassed, oppressed, and downtrodden of the thirteen united colonies. In her letter to Congress she set forth the difficulties the Colony labored under "for want of a regular form of government"; reminded Congress that the people of Massachusetts were now forced to raise an army to defend themselves "from the butcheries and devastation of their implacable enemies"; and requested "explicit advice respecting the taking up and exercising the powers of civil government."

Congress replied that no obedience was due to the act of Parliament altering the charter of Massachusetts, nor to a governor or lieutenant-governor who endeavored to subvert the old charter; that such men were to be considered as absent, and their offices vacant; and that the Provincial Conventions would do well to urge the people in the various places entitled to representation in Assembly to choose representatives, and that the Assembly so chosen should elect a Council to rule until such time as a governor appointed by his Majesty would consent to govern according to the charter.

New Hampshire came next, earnestly entreating for "the advice and direction of Congress with respect to a method for our administering and regulating our civil police." The advice was to call a full and free representation of the people, and that the representatives, if they think fit, "establish such a form of government as in their judgment will best produce the happiness of the people" during the continuance of the dispute with England. This form now became a standard, and before the year 1775 ended was given in precisely the same words to South Carolina and Virginia.

It must be noticed that in all these answers of Congress the governments recommended to be set up by the colonies are to continue till the dispute with the mother country be settled. But this dispute, as the months wore on, grew worse instead of better, and by May, 1776, had become so serious that Congress, without waiting to be asked, recommended each colony which had not already done so to take up civil government.

Acting on the advice of Congress, therefore, the colonies, or

States, as they quickly declared themselves to be, set about framing written instruments of government which went into force on these dates:

1776, July 2.....New Jersey
1776, July 5.....Virginia
1776, { July 15 / September 28 } .... Pennsylvania
1776, August 14.....Maryland
1776, September 10.....Delaware
1776, December 18.....North Carolina
1777, February 5.....Georgia
1777, April 20.....New York
1778, March 19.....South Carolina
1779, 1780, { March 2 } .....Massachusetts
1783, October 31.....New Hampshire

Connecticut and Rhode Island made use of their old colonial charters—the one till 1818, the other till 1842, when it was the oldest written constitution of government on earth.

In framing these instruments of government the people of the States were perfectly free to act. They were at liberty to put in or leave out whatsoever they pleased. These early Constitutions are therefore to be taken as the expression of the ideas of government of the people by the people current in the country in 1776, and are well deserving of careful examination.

They consisted in general of the preamble, the Bill or Declaration of Rights, and the Constitution proper. The preamble was usually a definite statement of the principles of government, of the purposes for which it is instituted, of the right of the people to establish it, and of the reasons which at that particular moment prompted the exercise of the right. Thus, in the Constitution of Massachusetts is this statement: "The end of the institution, maintenance, and administration of government is to secure the existence of the body politic, to protect it, and to furnish the individuals who compose it with the power of enjoying, in safety and tranquillity, their natural rights and the blessings of life. And whenever these great objects are not obtained, the people have a right to alter the government." "All government," says the Constitution of Maryland, "of right originates from the people, is founded in compact only, and instituted solely for the good of the whole." In the preambles to the Constitutions of New York, Pennsylvania, Maryland, New Jersey, North Carolina, South Carolina, and Georgia the motive for the act is distinctly stated to be the tyranny and misgovernment of England.

The Bill of Rights existed in seven Constitutions, and was a summary of what were considered the inalienable rights of man. All men were thus declared to be born free, and entitled to freedom of conscience, freedom of speech, trial by jury, the right of

petition, the right to bear arms, and the benefit of *habeas corpus*. The press must not be shackled. Property must not be taken without due compensation. There must be no cruel or unjust punishment; no excessive fines or bail; no *ex post facto* laws; no quartering of troops on the people in time of peace; and no exaltation of the military over the civil authority.

The Constitution proper provided in each case for a government consisting of three branches, and named them the legislative, the executive, and the judicial. In New England the legislative branch was called the "General Court"; in New York and New Jersey the "Legislature"; elsewhere it was the "General Assembly," but everywhere, save in Pennsylvania, in Georgia, and Vermont, it consisted of two Houses. The upper House, known sometimes as the Senate, sometimes as the Assistants, usually consisted of a body of men whose number was fixed and had nothing to do with population. There were ten, or twenty-four, or forty Senators, each one or two or three of whom represented a county, a district, or a populous city, without regard to the number of people who dwelt in it.

Nor were the people much better represented in the lower House, or second branch of the Legislature. There, too, in seven States the principle of representation was so many delegates from each town or each county, no matter whether the county contained one man or ten thousand. Indeed, the only States where there was any real representation of the people were New Hampshire, Massachusetts, Pennsylvania, and Georgia. In New Hampshire a corporate town of one hundred and fifty ratable polls had one representative in the General Court, and an additional representative for each three hundred polls over and above the one hundred and fifty. Massachusetts used the same system, but the mean increasing number was two hundred and twenty-five. Pennsylvania had no Senate, and limiting the membership of the Assembly to not less than sixty nor more than one hundred apportioned seats according to taxable polls. Georgia made population the basis of representation, and defined population to be all whites and three fifths of all blacks. Her ratio on this basis was two representatives to three thousand, three representatives to seven thousand, and four representatives to twelve thousand souls per county.

In this respect Georgia was far in advance of her sisters, for everywhere else taxation and representation were united. It was the "taxable poll" that was counted and represented, and nat-

urally enough it was the taxpayer, and the taxpayer only, who voted and held office. Yet even these restrictions were not thought enough, and to them religious tests and qualifications were added. No atheist, no freethinker, no Jew, no Roman Catholic, no man who did not believe in some form of the Protestant faith, could be a Governor of New Hampshire or New Jersey, Connecticut or Vermont. Any Christian possessed of a freehold estate of one thousand pounds might be chosen Executive of Massachusetts or Maryland. In North Carolina he must own a thousand pounds' worth of lands and tenements; in another, an estate of one hundred; in another, of five hundred; in another, of five thousand; in another, of ten thousand pounds; in others, he must own two hundred and fifty or five hundred acres of land, be a Trinitarian, and believe in the inspiration of the Scriptures, or a Protestant and a believer in the divine authority of the Bible, or acknowledge one God, believe in heaven and hell, and be ready to declare on oath that every word of the Testaments, Old and New, had come direct from God.

Senators in some States must own a freehold of three hundred pounds or personal property worth six hundred. In Delaware it was one thousand pounds of real or personal estate, or two hundred and fifty acres of land. In North Carolina it was three hundred acres. In Maryland it was an estate of one thousand pounds. In New Hampshire it was two hundred pounds. The property qualifications of members of the lower branches of the Legislatures were generally half as great as those of Senators. By such restriction numbers of men in every community were hopelessly debarred from ever, in the whole course of their lives, attaining to a seat in the Legislature of their State, or raising themselves to the dignified office of Governor. By other limitations like in kind many worthy citizens were prevented from even voting. The elective franchise was reserved for men who owned fifty acres of land or thirty pounds of personal property, or an estate of sixty pounds, or paid a yearly house rent of forty shillings, or were seized of a freehold worth twenty pounds; or, in the case of Georgia, had ten pounds of taxable property, or followed some mechanical trade.

The insignificance of the part assigned to the people by the early Constitutions is very noticeable. When the citizen has given his vote for a member of the Assembly and a member of the Senate, his part is played. The Legislature does all the rest, and is indeed the most powerful and important branch of Government.

It is the Legislature, not the people, that elects the Governor, chooses his Council, appoints and removes the judges of courts, the justices of the peace, the sheriffs of the counties, all civil officers, and all officers of the militia down to the grade of captain.

Compared with the Legislature, the Executive is little better than a clerk. No extensive patronage is his, no well-paid offices are at his disposal. Save in Massachusetts, he has no veto; save in New York, he has no power to prorogue. He may, at the will of the Legislature, be impeached and removed from office. This mingling of powers legislative with powers judicial and executive is in flat contradiction to the great principle set forth in each Constitution, that "the three essential departments of government" should "be kept separate and distinct," and that neither should exercise the powers of the others. Yet it existed everywhere, and is but one of many illustrations of how far the theory of government was in advance of the practice. Indeed, that the executive department should be unduly depressed and the legislative unduly exalted was inevitable. The Constitutions of the original thirteen States were framed at a time when men were still under the influence of the principles and the teachings of the Revolution. Their makers had themselves witnessed the bickerings and contentions, and had themselves suffered from the vetoes, the prorogations, and the tyranny of the royal Governor, and took good care that the Governors of their own creation should not walk in the way of their colonial predecessors. Everywhere, therefore, the Executive was hampered. From the preamble to the schedule these early Constitutions are marked all through by unmistakable signs of distrust of the one-man power and of perfect confidence in the Legislatures.

I have dwelt long on these details of the early State Constitutions because they are matters of great significance in any study of civil government in America. At the time these instruments of government were framed the phrases "rights of man," "inalienable rights of man," "life, liberty, and the pursuit of happiness," "freedom of conscience," and "freedom of worship," were in every man's mouth the land over. Yet when the State Constitutions—framed, as their preambles state, for the sole purpose of securing these great blessings—are examined, it appears that it was the rights of property, not the rights of man, that were respected and represented, for nowhere did manhood suffrage exist. Every one of the States guaranteed liberty of conscience; yet any

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man who did not exercise that liberty in such way as to become a Christian or a Protestant, or a believer in the Trinity, in the divine inspiration of the Testaments, or in the infallibility of the Pope, was punished by not being suffered to vote or hold office. Every one of the State Constitutions, again, forbids "cruel and unusual punishments," yet it was not then thought cruel to brand the forehead, cut off the ears, flog, imprison for debt, or put to death for any one of nineteen crimes now thought sufficiently punished by imprisonment for a few years.

Nevertheless, the theories of our ancestors were sound, whatever may be thought of their practice. Their faces were set in the right direction. They were moving forward, and having determined first on just what principles representative government ought to be established, and having expressed and defined those principles in their State Constitutions, they went cheerfully on with the labor of administration. But they had not gone far when it became quite clear that by a timid adherence to precedent and custom they had put into their Constitutions many things which had no place there, and these, the moment an opportunity served, they removed. How great was the experience gained by a few years of administration of government was shown in 1785, when Virginia provided for religious liberty; and in 1787, when two instruments of vast importance—the Ordinance of 1787 for the Government of the Territory of the United States Northwest of the River Ohio, and the Constitution of the United States—were framed at New York and Philadelphia. By each the rights of man were much extended. The ordinance forbade the further importation of slaves into the Territory, and guaranteed that no man should be molested because of his mode of worship or religious belief. On the subject of religion the Constitution was silent, but the omission was quickly supplied, and the first amendment prescribes that Congress shall make no law respecting an establishment of religion, nor prohibiting the free exercise thereof.

Reform in this respect was the order of the day, and in the general revision of State Constitutions which followed, the adoption of the Constitution of the United States is most marked. Between the day when Washington was inaugurated at New York and the day whereon he died at Mount Vernon eight Constitutions were made or amended, and by almost every one of the eight the rights of man were extended. Pennsylvania cast away her religious test, and put the ballot in the hands of every tax-

paying male. New Hampshire abolished the religious qualification once exacted of her Governor, and her legislators took off poll taxes and gave suffrage to every male inhabitant twenty-one years old. Delaware enfranchised every free white man who had resided two years on her soil and had paid his taxes, and no longer asked him if he believed in the Trinity and in the divine inspiration of the Testaments. South Carolina ceased to require her voters to be good Protestants, and opened the polls to Catholics. Georgia did away with her religious test for civil office, and relieved her voters from the necessity of owning ten pounds of property. In Kentucky and Vermont the reform went further yet, and by the Constitutions of those States manhood suffrage was, for the first time in our history, made a part of the political system of the United States. Between 1790 and 1800, therefore, a great step forward had been taken. During that period Church and State were parted; religion ceased to be a condition for the exercise of civil rights; the property qualifications were greatly reduced; and the democratic principle of universal suffrage was beginning to spread fast.

During the quarter of a century which now followed, the spread of democracy became particularly rapid, and strongly marked every Constitution made or amended within that period. Of the old thirteen States, but two had submitted their Constitutions to the people for approval. This idea was still held to, and was followed by Ohio, Louisiana, Indiana, Illinois, Alabama, and Missouri, as in the previous decade it had been followed by Georgia, Delaware, Kentucky, South Carolina, and Tennessee. Nevertheless, the will of the people was finding expression, and both governors and judges were beginning to be chosen by popular vote; the tenure of office of the judges was reduced from good behavior to a term of years, and in many ways the power of the Legislature was much restricted. The old theory that the delegates could safely be trusted to care for the welfare of the people was obsolete. He was now looked on and treated as the agent of the people, and subject to instruction which he must obey or resign. The Legislature became a body of agents, exercising delegated powers, and obliged, when their powers were not sufficient, to seek more from the people by way of a constitutional amendment.

This limitation of the Legislature, this assertion of the rights of the people, having thus begun, has never since been discontinued, and has in our own day reached a point which seems

almost extreme. Representative government, indeed, has come to have a fourth department, which for want of a better name may well be called administrative. In this new department is to be found not only the particular policy which the people wish to see carried out with respect to their social and economic affairs, but the most minute directions for executing that policy. The short, concise, and simple Constitution of Revolutionary days is a thing of the past; while from it, in the course of time, has been evolved an instrument which closely resembles a code of laws, and reflects the passing life of the people. The State of Alabama, for example, made her first Constitution in 1819, and her last in 1875. The first consisted of a Bill of Rights, a Schedule, an article on the Distribution of the Powers of Government; three more on the Executive, the Legislative, the Judiciary; and one in general provisions concerning education, slaves, banks, and method of amendment. The whole was stated in some ten thousand words. But when, in 1875, she framed her present Constitution, the ten thousand words became sixteen thousand words. The six articles were increased to seventeen articles, and matters which in 1819 were left to the wisdom of the Legislature were in 1875 treated in a most specific manner. There is still a declaration of rights, and the old article on the distribution of the powers of government; but that on the legislative department is expanded from twenty-nine to fifty-six sections, and that on the judiciary from eighteen to twenty-eight. There are new articles on State and county boundaries, impeachment, suffrage and election, representation, taxation, the militia, education, exempted property, oath of office, and corporations distinguished as private banking, railroad, and canal. In the Arkansas Constitution of 1836 there were seven articles; in that of 1874 there are nineteen. Missouri, beginning her Statehood with a Constitution of thirteen articles, expressed in some ten thousand words, has now a Constitution of fifteen articles, numbering more than twenty-six thousand words. In her Constitution of 1820 but three restrictions were expressly laid on the power of the General Assembly; one related to slavery, one to banks, while one forbade the granting of legislative divorces. In her Constitution of 1875, however, there are fifty-six sections limiting the powers of the Legislature. More than one half of these prohibit the passage of laws on designated subjects, or lay down with the utmost detail the manner of enacting, amending, or repealing laws then on the statute book.

What has taken place in Missouri has taken place in all the States. Their Constitutions abound in the details of administration. Some Legislatures can not create any corporation except by general law. Some can not give money to any church or religious denomination or minister thereof, or loan money to any corporation or individual; or release debts due the State; or levy a State or county tax beyond a certain percentage on the assessed value of the property taxed. Others can not sit for more than a certain number of days, or enact a law which was not introduced within a certain number of days after the opening of a session. Still other Constitutions fix the rate of interest, exempt certain property from levy on execution, prescribe the details of foreclosure in the courts, and fix the number of hours that shall be a legal day's work. Yet even these are surpassed by the new States of the far Northwest. The rush of population westward and the astounding growth of the country have produced a state of society of which the early Constitution-makers never dreamed. New offices have sprung into existence; new social conditions have arisen, and new problems in political economy and government have been thrust on the people for solution. Commissioners of labor, of education, of agriculture, of railroads, of fish and fisheries, and of forestry; bureaus of statistics, of immigration, of industry, boards of public charities, and boards of public works, have everywhere been created. Institutions for the education of the blind, the deaf and dumb, the reformation of criminals, and the guarding of the insane have been founded; and great social movements against the liquor traffic, against trusts and corporations, have taken place. One hundred years ago the Legislatures would have been left to provide for the management of all the offices and institutions, and the solution of all these problems, in such way as seemed best; now they are invariably made the subjects of constitutional provisions. In a word, State Constitutions have ceased to be a summary of the guiding principles of government, and are fast becoming a code of laws.

While the people have thus been busy putting into their Constitutions barrier after barrier against the tyranny of Legislatures, the judiciary, by declaring laws to be unconstitutional, has put up the greatest barrier of all. The right to declare laws unconstitutional is nowhere specifically granted, and is peculiar to the judiciary of the United States. There are now in Europe many nations living under written constitutions. Germany is such a one, and France and Spain and Switzerland and Belgium; yet in

none of them can such a thing be done. That it exists with us is due to the fact that with us, and with us alone, the judiciary has been lifted from the place of a subordinate to the place of a co-ordinate branch of government. The fundamental principle on which all government in this country rests is that the people constitute the sovereign; that the sovereign has willed that the powers of government shall be divided between three separate departments—the executive, the legislative, and the judicial; that each of these shall exercise delegated powers, well defined and limited; and that the limitations may not be misunderstood or forgotten, they have been put in writing in instruments called Constitutions. Under such a form of government the judiciary stands on the same footing as the legislative or the executive branch; exercises delegated powers; is responsible to the people alone; and, as it acts for the people, is independent of either of the other branches. Its sphere is judicial, and the Constitutions being the supreme law of the States for which they were made, the interpretation of them is a judicial act, and belongs to the judiciary. From time to time, therefore, as Legislatures have passed unconstitutional laws—that is to say, laws requiring the exercise of a power not legislative in its nature or contrary to some provision in the State or Federal Constitution—the courts as interpreters of the Constitutions have set such laws aside. Their action, however, is legal, not political. They have never attempted to act till some case involving the law has come before them; then, by refusing to enforce the statute, as one the Legislature had no power to pass, it is annulled, a precedent is set up, no new cases are brought, and the law becomes a dead letter.

Not the least interesting incident in the history of the early State Constitutions is the signal service they rendered the framers of the Constitution of the United States. That instrument was made during the summer of 1787 by the most remarkable deliberative body of men of which history makes mention. They came as delegates from twelve States, and during four months sat in secret session in Independence Hall, Philadelphia. They had come with instructions to amend the Articles of Confederation; but they had not gone far in their work when the articles were cast aside as past all mending, and the labor of framing a new instrument of government was begun. The Constitution then framed is in no sense, as Mr. Gladstone has described it, "the most wonderful work ever struck off at a given time by the brain and purpose of man." It was not "struck off at a given time."

It was a slow and gradual growth. It was the product of a long, varied, and bitter experience. It is the work of men coming from the three great sections of the country; of men trained in three distinct schools of local government, differing in manners, in customs, in occupations, in forms of religious worship, and holding, with a tenacity which more than once well-nigh broke up the convention, diverse and opposite views of trade, commerce, and navigation. In such matters as all could agree upon they drew partially on the experience of the English-speaking races, and very largely on the experience of the colonial and State governments. When no common point of view existed, agreement was purchased by compromises and concessions. Only when absolutely forced to do so by necessity did they depart from experience and insert in the Constitution some new and untried feature of government. The labor of the convention may therefore be said to have been as that of selection and compromise. The Constitution may be described as an instrument whose principles are either original, derived, or the result of compromise. In evidence of this let the Constitution be cited, article by article.

By the first article it is ordained that all legislative power shall be vested in a Senate and House of Representatives; that in the Senate the States shall have equal representation; that the Senators shall serve for six years, and that one third of them shall go out each two years. Yet in all this there was nothing new. The two-branch Legislature existed in every State then in the Union save Pennsylvania and Georgia; the name "Senate" for the smaller branch was used in eight States, while the name "House of Representatives" for the larger branch was in use in four.

No provision, at first sight, seems to be more arbitrary than that giving to the House of Representatives of the First Congress, a membership of sixty-five. Yet here again precedent was closely followed. Under the Articles of Confederation each of the thirteen States was entitled to seven delegates. Had each sent so many, the greatest number of men who could at any time have had seats in Congress would have been ninety-one, and this was selected as the number for the First Congress under the Constitution. As each of the thirteen was given two Senators, there were to be twenty-six members of the Senate, and consequently there could be but sixty-five members of the House.

The requirement that population, for the purpose of apportioning representation and direct taxes, shall consist of all free

persons, and three fifths of all others—excluding Indians not taxed—was the rule proposed to the States in 1783 by the Continental Congress for apportioning the share each should bear of the annual cost of Government. The idea of a census every ten years was borrowed from the Constitution of New York, which prescribed such a counting of the people every seven years, and from the proposition of Congress just mentioned. From the Constitutions of New York, of Delaware, of Pennsylvania, and of Virginia came the provision for the retirement of one third of the Senators every two years. The office of the President was suggested by the Lieutenant-Governor and deputy Governors of the States. Indeed, the name was in use in four States. But it seems quite likely that the framers of the Federal Constitution borrowed from the Constitution of New York, where the Lieutenant-Governor presided over the State Senate, had no vote unless there was a tie, succeeded the Governor if succession became necessary, and was in his turn succeeded by the President *pro tem.* of the Senate. All the details of impeachment, trial, and punishment of the President are to be found in the old Constitutions of New Hampshire and Massachusetts, New York and Pennsylvania, Delaware, Virginia, and South Carolina. Nay, the very words, "two thirds of the members *present*," are taken from the Constitution of South Carolina.

Section five of Article I has to do with the administrative affairs of each House, with its power over its own members, with its duty to keep a journal, its right to frame rules for its own proceedings, and to adjourn from day to day. Not one of the State Constitutions but contained precisely the same provisions. Exemption from arrest, and the command that no Congressman shall hold any office under the United States, were in the Articles of Confederation. The restriction that all money bills must originate in the House of Representatives is from New Hampshire and Massachusetts, with scarcely the change of a word. The veto, also, is of Massachusetts origin.

In the eighth section—the section in which is summed up the powers of Congress—there are eighteen paragraphs. Ten of them convey powers granted by the Articles of Confederation. The substance of another is to be found in an old ordinance of Congress. Three more—that granting power to lay taxes, duties, imposts, and excise; that granting power to regulate trade with foreign countries and among the several States; and that defining the three occasions on which the militia of the State may be called

out—were the direct result of that disastrous experience in which the Confederation had been wrecked entirely.

The ninth section opens with the second of the famous compromises; of the remaining paragraphs, the majority are from the Constitutions of the States, and one is from the Articles of Confederation. For the long list of powers denied the States, the old articles were again resorted to, and from them were taken the prohibitions that no State shall make a treaty, or form an alliance, or enter into a confederation, or issue letters of marque, or grant a title of nobility, or keep ships or troops in time of peace, or enter into any compact with a foreign power. The prohibitions on the issue of bills of credit, and on the passage of tender acts and acts impairing the obligations of contracts, were put in to save the country from a repetition of the dreadful condition of affairs under which it then labored. Two years before, nine States had poured out on their citizens a flood of paper money. Scarcely had the bills been issued than depreciation began. No sooner did depreciation begin than tender laws and force acts followed; then the sanctity of contracts was disregarded, and every man who had contracted a debt or borrowed specie on a mortgage hastened to discharge his indebtedness with worthless paper. In Massachusetts, where the General Court would not grant such privileges to the people, the debtors rose in armed rebellion against the State. The restriction was, therefore, the result of bitter experience.

What is thus true of the provisions concerning the legislative branch is equally true of the provisions concerning the executive branch—they also are borrowed. The Executive is called the President; but so in 1787 were the Executives of Delaware, Pennsylvania, New Hampshire, and South Carolina. The President is commander in chief of the army and navy; so were the Governors of all the States save one. The President can pardon criminals; so could the Governors of all the States save four. The very college of electors by which he is supposed to be elected was fashioned after that of Maryland; the oath which he takes on the day he is inaugurated was borrowed from Pennsylvania. New York furnished the idea of the annual message, and the power of the Senate to ratify or reject his appointments. North Carolina supplied almost the very language of the provision that he may fill vacancies during the recess of the Senate, by granting commissions to expire at the end of the next session.

The establishment of the judiciary, and its elevation to a place

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co-ordinate with the executive and the legislative branches, was beyond all question one of the few great acts of the convention; yet for this eleven States provided examples; nor does it seem unlikely that the old "Court of Appeals in Cases of Capture," which, as the members of the convention were assembling, held its last session in Philadelphia, was without its influence in the establishment of our Supreme Court with appellate jurisdiction. The recognition of interstate citizenship and the provision for the return of fugitive slaves and criminals fleeing from justice were as old as the New England Confederation of 1643. Power to admit new States was given to Congress in order to provide an open door for the entrance of Vermont and Kentucky, and the three, or five, new States which, by the Ordinance of July, 1787, the Continental Congress pledged itself to make out of the Territory Northwest of the River Ohio.

But it is needless to multiply instances. From the opening provision that one branch of the Legislature shall be called the Senate, to the closing provision that the new form of government shall be put in force by the assent of nine States—the number necessary to pass an ordinance of any importance in the Continental Congress—the Constitution is full of restrictions and provisions, of grants of power, of names, of offices, and of definitions of duties, borrowed from the Constitutions of the thirteen States or the Articles of Confederation.

Is there, then, nothing new in it? Is that splendid instrument, under which we have grown from the weakest of nations to be the strongest, from the poorest to be the richest, giving to the whole earth an object-lesson in government of the people, by the people, and for the people, a digest, an abstract, a thing of patches? The ardent Federalists of 1788 delighted to speak of the Constitution as "the new roof" resting on the States as pillars. The simile was most fitting. It is indeed a new roof, fashioned in a new manner, cut out of timbers whose strength experience had carefully tested and whose fibers time had seasoned thoroughly. But was every timber old? Not by any means. The command that Senators and Representatives shall not be appointed to offices created during their term of office; the definition of treason; the abolition of export duties; the guarantee of a republican form of government to the States; the declaration that the Constitution is the supreme law of the land; and the mode of amendment, have no prototypes anywhere. They indeed are new.

Though the framers of the Constitution thus drew so largely

on the experience of the States, and put in it so much with which the people were already familiar, the document no sooner went forth for ratification than it was assailed with bitterness. To thousands of well-meaning men in every State the new plan was hateful because it would be too costly; because it was to be a government of three branches instead of one; because Congress was to lay taxes; because liberty of the press was not assured; because trial by jury was not provided in civil cases; because religious toleration was not guaranteed; because it began with "We, the people," and not with "We, the States"; because it was not a confederation, as it should be, but a government of individuals, as it should not be.

It was, indeed, ratified in spite of these objections; but the objectors were many and bitter, and to appease their wrath ten amendments were soon added to the instrument. But these, again, were not new, for they are, with scarcely an exception, selections from the Bills of Rights and Declarations of Rights which then preceded seven of the State Constitutions. That they have proved of any real advantage, that they have secured to the people of the United States any benefits they would not otherwise have enjoyed, that they have kept off any evils from which the people must otherwise have suffered, may well be doubted. The real defects in the Constitution, the defects which in the course of a hundred years have one by one been developed, are the direct result of that marvelous progress it was not in the power of any man who in 1788 defended or opposed the Constitution to foresee.

Nothing cost the framers more pains than the manner of electing a President, yet no part of their work has proved so futile. Clearly their intention was to make the electoral college a body with sole power to seek out and elect the proper man for President, each elector exercising the utmost freedom of personal choice. It was never for a moment intended that the people should name the Executive. The member of the convention who declared that to leave the choice of a President with the people would be as foolish as to leave the choice of colors to a blind man, expressed no more than the common belief of his fellows; but how has time turned this wisdom into foolishness! The railroad, the steamboat, the telegraph, means of communication and travel concerning which the men of 1787 knew nothing, made the national nominating convention possible, and stripped the electors of the privilege of choosing. The gradual extension of the cus-

tom of electing the electors by the direct vote of the people has deprived the electors of all real need of voting, and has reduced them to mere boards for registering the popular decision expressed at the polls. In the early days of the Constitution, again, no vote was taken for Vice-President. Each presidential elector wrote on his ballot two names, without in any manner indicating which he wished to be President or which Vice-President. When the votes were counted before Congress, the man who received the highest number, provided it was a majority, was declared to be President. The man who received the next highest, whether it was or was not a majority, was declared to be Vice-President. But when the fourth presidential election took place, in 1800, this plan failed utterly. Jefferson and Burr received precisely the same vote, and the duty of selecting the President passed to the House of Representatives. The twelfth amendment was promptly added to the Constitution, and since 1804 the presidential electors have always voted for the Vice-President on a separate ballot.

Still, the people have never been satisfied with the manner prescribed for electing the President. Again and again, year after year, they have condemned it, till, of the several hundred amendments to the Constitution offered during the past century, those concerning the Executive are the most numerous. Never has a period of four years gone by without at least one such amendment being offered; repeatedly as many as three have been introduced at the same time. Since the civil war forty-four amendments concerning the election of the Executive have been before Congress.

The work of the convention has been found wanting, in the second place, because certain needed powers have been omitted. From such information as can now be had, it does not seem that any member of the convention even for a moment supposed that the vast stretch of country beyond the Mississippi—a country then and long afterward supposed to be a desert—would ever be added to the public domain. Not a word, therefore, is said in the Constitution about the right to acquire foreign soil. Acquisition of it by purchase has, therefore, again and again been pronounced to be unconstitutional, and was in 1803, in 1844, and in 1848 met with an angry opposition which seriously threatened the safety of the Union.

The omission of a plain statement that there is a final arbiter for the settlement of disputes between the Federal Government

and the States has cast doubt on the right of the Supreme Court to act as such, and has furnished the opportunity for many quarrels and many acts of defiance on the part of the States; for the Virginia and Kentucky Resolutions in 1798 and 1799; for the long list of like resolutions passed by ten sister States; for the ordinance of nullification in 1832, and for the many ordinances of secession in 1861.

While we may reasonably lament that powers to prevent such occurrences were not specifically granted, we have every reason to rejoice that so many of the powers which were specifically granted were so ill-defined. If there is any one thing to which more than to another we owe the permanency of our Government—if there is any one reason to which more than to another we may ascribe the fact that, while all around us written Constitutions have sprung up, flourished exceedingly, and died by the score, ours has come triumphantly through every period of stress —it is this, that so little is settled dogmatically; that so much is left for experiment. The interpreters of our Constitution have been the Presidents, in their messages and vetoes; Congress, in its debates, its acts and resolutions; the Supreme Court, in its decisions; the Governors of States; the Legislatures of States; the State judges; political parties, in their platforms; and the people. Now the dispute has raged over the powers of Congress; now over that of the Presidents; now over the Supreme Court; now over the nature of the Constitution itself; and now over the manner and meaning of its ratification. Now the contending parties have tormented themselves with such questions as, Is it a compact, or an instrument of government? Was it framed by the people, or by the States? Is there a common arbiter? May the State interpose? May the General Government coerce? May a State secede? Yet, many as were the interpreters, various as were the questions to be interpreted, hot as were the disputes, sixty years passed away without one amendment being added to the Constitution.

It must not be supposed, however, that none were offered. There is, indeed, hardly a clause in the Constitution which has not at one time or another been cited as the reason for following, or the reason for not following, some particular line of policy. Those who have favored any policy have usually been content to justify it as wise, as timely, as necessary; those who have opposed any policy have invariably sought defense in a denial of the constitutional right to adopt it. Whichever side

has lost has very commonly sought revenge in a proposed constitutional amendment. These propositions have, therefore, reflected the passing notions of the hour, and are most instructive.

Thus, between 1789 and 1800, while the Federalists were establishing the Government, the Republicans demanded a better definition of the direct tax, a definite denial of the power of Congress to grant charters, and a provision that no citizen can sue a State. Between 1800 and 1815 the electors failed to choose a President; Louisiana was purchased; the United States judges were removed; the impeachment of Justice Chase miscarried; the long embargo was laid, and a second war fought with England. The result is a new and yet more bountiful crop of proposed amendments reflecting popular opinion on all these matters. Some relate to a separate ballot for Vice-President, and some to the manner of choosing Presidents and limiting the number of their terms of office. Some are concerned with the judiciary, and provide for the removal of judges on joint addresses of both Houses, or fix the years of service, or set bounds to the powers of the courts, or shorten the term of Senators, or restrict the power of Congress over embargoes and the admission of new States.

The period 1815 to 1835 was one of the most astonishing economical developments, which in its turn is reflected in the proposed amendments. Calls are made by the States, by the President, by Congress, for power to build roads and canals; for power to carry on internal improvements; for power to distribute the proceeds of public-land sales. Again the electors fail to choose a President, and another host of amendments, embodying all manner of methods, come pouring in to Congress. The Supreme Court is busy setting aside acts of the State Legislatures as unconstitutional, and once more the Court is attacked in amendments.

Between 1837 and 1861 the removals from office by Jackson, the vetoes of Jackson and Tyler, and the attempt to extend slavery into the free Territories acquired from Mexico, add nearly one hundred more to the already long list of amendments offered in Congress.

At the root of all this desire for amendment there lay, it must be noticed, no great principle of government. They are, without exception, temporary expedients to cure temporary evils, which needed no cure, and soon passed away. But in this respect the civil war produced a marked and signal change. In

that dreadful contest State sovereignty went down and Federal sovereignty arose. The national Government, not the State government, has thenceforth been looked up to as the righter of wrongs, the corrector of abuses, and the preserver of morals; and individuals, societies, and sects, have made haste to lay their grievances before Congress and ask for redress by an amendment of the Federal Constitution. Since 1861 these propositions number more than four hundred, and cover forty-four distinct classes. Some, it is true, have in one form or another tormented Congress for ninety years; but the majority have not, and indicate nothing so plainly as the belief that the Government is now a great national Government, and that its duty is to provide, in the broadest sense, for the "general welfare" of the people.

CHAPTER XI.

HOW WE ARE GOVERNED.

FOREIGNERS find much difficulty in understanding how there can be in the United States "two governments covering the same ground, commanding, with equally direct authority, the obedience of the same citizen." The explanation of this dual system must be sought in the history and development of our institutions.

The various English settlements on our Eastern seaboard began as charter, proprietary, and royal colonies. At the beginning of the struggle for independence they had already grown or coalesced, under the "salutary neglect" of the home Government, into thirteen vigorous and in the main self-governing communities, holding practically identical relations with the British Crown. All had developed legislative assemblies, claiming and exercising very large powers of local legislation. All acknowledged the right of England to legislate on imperial affairs, such as foreign or commercial relations. Distinct in territory, and independent of each other in government, their only political bond was this connection with the British Crown.

Under such circumstances, they formed, as Mr. Burke said, by imperceptible habits a familiarity with "a double legislature," the one to deal with local and the other with imperial interests, sometimes perhaps performing the very same functions, but not very grossly or systematically clashing.

Their first resistance to the mother country was by voluntary co-operation through a Congress having nothing but revolutionary authority. After the Declaration of Independence they sought to form a closer union under the Articles of Confederation, whereby the colonies, now become States, "severally" entered into "a firm league of friendship with each other for the common defense" and "general welfare," and "for the more convenient management of the general interests of the United States." It was declared that, in so doing, "each State retains

its sovereignty, freedom, and independence, and every power, jurisdiction, and right which is not by this Confederation delegated to the United States in Congress assembled."

A brief and bitter experience disclosed that a mere advisory council, liberally endowed with prerogatives, but with no power to lay taxes or to enforce its ordinances, could neither avail for the common defense nor preserve order within and between the States. Accordingly, a convention was called in 1787, to devise such alterations and provisions in the Articles of Confederation as should be adequate to the exigencies of government and the preservation of the Union." The work of this convention was the Constitution of the United States, which was formed by delegates from all the States, except Rhode Island, and successively ratified by each one of them through conventions called for the express purpose of considering its adoption.

The Federal Government is thus the creature of a written Constitution, as were already the governments of the several States that formed it.

The experience of the colonies with charters granted by the Crown, or by the proprietors, had trained them to some form of fundamental written law. The new governments all proceeded from the idea that the people are the only rightful fountain of authority.

It was natural, therefore, as soon as the allegiance of the colonies was withdrawn from the British Crown, and they found themselves free, independent, and sovereign States, that they should proceed to frame written Constitutions, in which the people both ordained the form of government and the power they were willing to intrust to it. By what has become one of the fundamental principles of American constitutional law, those powers are always distributed with great care among three grand departments, each as far as possible independent of the others, to the end that no one of them might grow too strong for the others, and no combination of them might imperil the rights of the people. These departments respectively make, declare, and execute the law—the Legislature, the Judiciary, and the Executive.

We must now turn to the Constitution of the United States to see what is the framework of our Federal Government, and what powers the people of the States conferred on that Government, remembering that, by virtue of its origin, it is a government of limited and enumerated powers, having been clothed with so much and no more of the powers already possessed by

the several States and the people thereof as they deemed necessary for the purposes for which it was called into being. Whatever is not conferred in the Constitution is withheld, and belongs to the several States or the people thereof.

How Federal Laws are made.

The Constitution vests all the legislative powers granted to the United States Government in a Congress, to consist of a Senate and House of Representatives. By a compromise between the large and small States representation in the Senate is equal, each State having two Senators. In the House the States are represented according to their respective populations, as ascertained by each decennial census. Thus, in the Senate, New York, with a population in 1890 of 5,082,871, has the same number of Senators as Nevada, with a population of 43,761; while in the House, New York has thirty-four Representatives and Nevada one.

Representatives are chosen every second year by a direct vote of the people in their respective districts, the qualifications for voting being the same as those required by the Constitution of a State for choosing members of the most numerous branch of its own Legislature. As there are forty-four States the Senate now has eighty-eight members. The first House of Representatives had sixty-five members, or one for 33,000 population.

The present House—whose term began March 4, 1893—is composed of 356 members, or one for each 173,901 population, as returned by the census of 1890.

The qualifications for a Representative are that he must have attained the age of twenty-five years, have been seven years a citizen of the United States, and that he must be, when elected, an inhabitant of the State in which he shall be chosen.

A Senator must be thirty years of age, nine years a citizen, and likewise an inhabitant of the State choosing him.

Members of each House receive a salary, paid out of the United States Treasury, of $5,000 a year, with mileage at the rate of twenty cents per mile, going and returning, for each session of Congress.

After each census, Congress determines the number of members of which the House is to consist for the next ten years, and apportions the Representatives among the several States; this allotment being made, each State Legislature divides the State into districts.

When a vacancy occurs in the representation from any State the Governor issues a writ for a special election, the people alone having power to choose members of the House.

The roll of the House of Representatives is made up by the Clerk of the previous House, who presides over the new body at its first meeting, until the election of Speaker, and who puts all motions that may properly be made before the Speaker is chosen. The Speaker is the presiding officer of the House. He is elected at the beginning of each Congress, and holds his office during the two years of its existence. His salary is $8,000 a year. The other officers of the House are a Clerk, Sergeant-at-arms, Doorkeeper, Postmaster, and Chaplain.

The Senators are divided into three classes, one third of the body being chosen every two years. A vacancy occurring during the recess of the Legislature of a State may be filled temporarily by the Governor until the next meeting of the Legislature. The Senate has recently decided that, in the event of a failure of a Legislature to elect a Senator when it had the opportunity to do so, the Governor may not appoint. The division into three classes was made by the first Senate, and when a new State is admitted into the Union the two Senators first chosen draw lots, and in this way is determined the class in which each belongs—that is, assuming that the choice were made in the year 1894, whether a new Senator's term would end on March 4, 1896, or 1898, or 1900.

The presiding officer of the Senate is the Vice-President. He has no vote unless the Senate is equally divided. Therein he differs from the Speaker, because the latter is a member of the body over which he presides, and has a vote on all questions, if he chooses to vote, besides having the casting vote on a tie. The Senate also chooses a President *pro tempore*, a Secretary, and the other usual officers. The President *pro tempore* presides over the Senate when the Vice-President is acting as President, or is absent beyond an adjournment.

The Senate has executive and judicial functions which do not belong to the House of Representatives. It is the court presided over by the Chief Justice for the trial of impeachments, and it is charged with the duty of confirming or rejecting the President's nominations to the principal offices, and of ratifying or rejecting treaties negotiated and proposed between the United States and foreign powers. Two thirds of the Senators must concur to ratify a treaty. The House of Representatives has the

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sole power of impeachment. It prefers the charges and appoints the managers, or counsel, to represent it before the Senate sitting as a court.

The duty of prescribing the times, places, and manner of holding elections for Senators and Representatives is left to the Legislatures of the different States, but Congress may make laws itself concerning these matters except as to the places of choosing Senators. The Senators are the representatives of the States as political organisms, and consequently the Federal Constitution limited the power of Congress over the election of Senators.

Each House judges for itself as to whether persons claiming membership in it have been properly elected and possess the requisite qualifications.

A majority is a quorum in each body, and both the House and Senate have the power to compel the attendance of members, to punish them for disorderly behavior, and to make rules of procedure. Two thirds of each House may expel a member. Congress must meet at least once a year, on the first Monday in December, unless it appoints another day by law.

Neither House may adjourn during a session of Congress without the consent of the other for more than three days. The presence of both branches is essential to lawmaking. Sometimes, as at the beginning of a presidential term, the Senate sits alone in special session for the discharge of executive duties, especially for the purpose of acting upon nominations to office.

The only special privilege attaching to Senators and Representatives is freedom from arrest during their attendance on Congress, or as they are going to or returning from the Capitol for that purpose. In aid of the freedom of debate, it is prescribed that a member of Congress shall not be held answerable outside of the Senate or House for anything that he may utter in debate.

For the more complete accomplishment of the independence of the legislative and executive branches of the Government, it is provided in the Constitution that members of the Senate and House of Representatives may not be appointed to any civil office which has been created, or the emolument of which has been increased, during their terms of service. After their terms have expired they are eligible to any public employment; but so jealously has the independence of the two branches of the Government been guarded, that the propriety of appointing an ex-Congressman to a civil office, created or made more profitable during

his term, immediately after his return to private life, has been questioned. The Constitution also forbids any one holding office under the United States to be a member of Congress.

The Congress enacts the laws under and in obedience to the Constitution. Whatever may be the constitutional theories prevailing in the legislative branch of the Government, the framers of the statutes of the United States must rest their work upon the fundamental law adopted by the people. The question as to the constitutionality of a statute is a question as to its existence. If the judicial branch of the Government declares it to be unconstitutional, it is not law. It is as effectually destroyed as if Congress had repealed it.

The first step in the making of a law by Congress is the introduction of a bill. Any member of either House may introduce a bill on any subject. The proposed law is then referred to its appropriate committee. The committees have jurisdiction over bills according to their subjects, as is indicated by the titles of almost all the committees; for example, Appropriations; Post Offices and Post Roads; Indian Affairs; Judiciary; Military; Naval Affairs; Foreign Affairs; Privileges and Elections, referring to the right of each House to look into election returns and qualifications of its own members.

The leading committee of the House of Representatives is the Ways and Means Committee. It considers every bill relating to the raising of revenue. The chairman, by reason of his position, has been the leader of the majority on the floor of the House. This is traditional, but it does not always follow that the Ways and Means chairman leads. At present there is a tendency to make the senior majority member of the Rules Committee the general leader on the floor on all questions relating to the order of proceedings, as he introduces and defends the propositions of that committee for regulating the business of the House. The methods of transacting the business of the House are in a transition state. The Rules Committee is now charged with the duty of reporting as to the measures to be considered and the time at which a vote shall be taken on a pending bill or resolution. It seems likely, therefore, that in the future the Chairman of the Ways and Means Committee, like the chairmen of the other committees, will have special charge on the floor of the conduct only of those bills which are reported by his committee.

There is one important qualification as to the power of the Senate to originate bills. While a Senator may introduce a bill

on any subject, the Senate itself can not originate revenue measures. This power is bestowed upon the House of Representatives alone, the Constitution following the British precedent, that all money bills must originate in the House of Commons. The House of Representatives has construed this grant of power so strictly that it insists upon the right not only to originate all bills providing for taxation, but all bills making appropriations or distribution of the revenues for the support of the various departments of the Government. When a revenue or appropriation bill has reached the Senate, it is referred either to the Finance or Appropriation Committee, and then the bills proposed by individual Senators are considered, if at all, as proposed amendments.

When a bill has passed both Houses of Congress it is presented to the President. If he signs it, or fails to return it within ten days, the bill becomes a law. If Congress prevents the return by adjourning within the ten days, the bill fails to become a law.

If the President objects to a bill he must return it to the House in which it originated, with his objection in writing. If the two Houses again pass the measure, each by a two-thirds vote, the bill becomes a law notwithstanding the President's objections. Every measure requiring the concurrence of the two Houses must be thus presented to the President.

The powers of Congress are such as the framers of the Constitution deemed to be essential for the welfare of the whole country, for the maintenance of the Union, and the preservation of the harmonious relations of the States. The Federal Government was also made the representative of the States in dealings between this country and foreign powers, and was therefore given exclusive jurisdiction over commerce, diplomacy, and war. It is also the representative of the States in their dealings with one another, and so its jurisdiction extends over commerce between the several States and with the Indian tribes. Many of the powers necessary to enable the Government to perform these great functions are enumerated in the Constitution.

Congress has the power to lay and collect taxes, duties, imposts, and excises for the purpose of providing funds for the payment of the debts, and for the common defense and general welfare of the United States. Whatever burdens of this character it imposes, however, must rest equally upon the people. Congress may also borrow money, and it alone may coin money and regulate its value. Its power to support armies is limited by a

provision of the Constitution that no appropriation of money for this use shall be for a longer term than two years.

No money whatever can be expended by the Executive except in consequence of appropriations made by Congress. Capitation and direct taxes must be laid in proportion to population, as shown by the census tables every ten years. No tax can be laid on exports.

Congress establishes the laws or rules under which foreign-born people may become citizens of the United States. For the furtherance and security of trade and commerce between the several States, it not only enacts the coinage laws but provides penalties for counterfeiting. A comparatively recent decision of the Supreme Court holds that Congress may also authorize the issue of paper currency. The first decision on this subject was based on the argument that the power to do this was an essential attribute and incident of the power to make war and support armies, but a subsequent decision extended the principle, as has been indicated. It is very doubtful, however, if Congress will ever go any further than it has already traveled on the path pointed out by the court. Congress also establishes post offices and post roads, and has lately undertaken to regulate the business of railroads transporting goods and passengers through several States. All laws relating to commerce, as to every other subject within the Federal jurisdiction, must be uniform as regards the States. It may be laid down as a general proposition, although there are some exceptions, that Congress deals with the State as the State deals with the individual citizen. Therefore all the States stand on a common footing under the Federal laws relating to commerce, no State having any statutory advantage over any other part.

Congress is directed by the Constitution, in order that science and the useful arts may be promoted, to enact copyright and patent laws. For administering justice under Federal laws, Congress may establish tribunals inferior to the Supreme Court, which is established by the Constitution itself. As to relations between this country and foreign nations, the Senate confirms ambassadors, ministers, secretaries of legations, and consular officers, and ratifies treaties. Congress enacts laws governing immigration, and may enact a general bankrupt law. It also enacts laws for the definition and punishment of piracies, felonies on the high seas, and offenses against the laws of nations.

The war jurisdiction of the Federal Government is as extensive as it is essential. The only limitation upon the power of

Congress to raise and maintain armed forces on land and sea has already been mentioned. Besides providing for the regular forces of the United States, it may also make provision for calling the State militia to the aid of the General Government for the suppression of insurrection and the repelling of invasions. If the public safety shall require it, in case of rebellion or invasion, but not under any other circumstances, Congress may suspend the privilege of the writ of *habeas corpus*.

Treason against the United States is defined by the Constitution to consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort. The Constitution further requires, for conviction the testimony of two witnesses to the same overt act, or a confession. But Congress is empowered to declare what shall be the punishment for the crime. Such punishment, however, must be inflicted on the guilty person alone. It can not work corruption of blood, or a forfeiture of his property beyond the life of the person himself.

These are the powers which the States have conferred upon Congress. Some laws are enacted by the Federal authority which control and govern the citizens who reside within the Territories, or in the reservations owned by the General Government, with the exception of certain restrictions imposed by the first amendments to the Constitution, which were in the nature of a bill of rights. Congress is left to its discretion in making laws for the people of the District of Columbia, of the Territories, and of the lands which have been ceded by the States to the General Government, for the purposes of navy yards and forts, and for the building of necessary structures for the business of the Government, and for the maintenance of the Military and Naval Academies.

In order to preserve republican simplicity, and to protect and encourage the spirit of democracy, the United States are forbidden to grant titles of nobility, and no officer of the Government may accept any reward, honor, present, office, or decoration from a foreign power, without the consent of Congress. The first amendments which were proposed by the First Congress having been demanded by some of the States as a condition of their assent to the Constitution, contain the safeguards of personal liberty which were achieved by the barons and the people of England, and embodied in Magna Charta and the Bill and the Petition of Rights. Congress is forbidden to make any law respecting the establishment of religion, or prohibiting the free

exercise thereof. It may not abridge the freedom of speech or of the press, or the right of the people peaceably to assemble, and petition the Government for a redress of grievances. The people reserved the right to bear arms. Soldiers may not be quartered in any house, except in time of war, and then in pursuance of established laws. The right of the people to freedom from unreasonable searches and seizures, and from arrest without proper warrants, is affirmed. No one can be held to answer for a capital or infamous crime without presentment or indictment, and no one may be deprived of life, liberty, or property without due process of law, or be twice put in jeopardy of life or limb. Excessive bail shall not be required, excessive fines imposed, or cruel and unusual punishments inflicted. The right of trial by jury is preserved. Private property may not be taken for public use without just compensation.

The powers of Congress over suffrage are granted by the amendments adopted after the close of the civil war. They are known as the Fourteenth and Fifteenth Amendments. The Thirteenth Amendment prohibits slavery within the United States. The Fourteenth Amendment makes every native or naturalized person in the United States a citizen, and declares that all shall have the equal protection of the laws. It provides that Representatives in Congress shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State, including Indians not taxed. If a State denies or abridges the right of suffrage to any male citizen who is twenty-one years of age, except for participation in rebellion or other crime, the basis of representation of that State shall be proportionately reduced. This amendment would seem to leave to each State the option of choosing between a limited suffrage with reduced representation and universal suffrage with full representation; but the Fifteenth Amendment provides that the right of suffrage shall not be denied or abridged by the United States, or by any State, on account of race, color, or previous condition of servitude. Except these there are no restrictions over the control by the States of the qualifications of voters. They may, and some of them have, admitted to vote unnaturalized inhabitants who have declared their intention to become citizens. Other States have required an educational or a property qualification as a condition precedent to the right of voting. The matter so far is entirely regulated by State law, the Federal Constitution providing that in each State the electors for Represent-

atives in Congress shall have the qualifications requisite for electors of the most numerous branch of the State Legislature.

Within the last thirty years Congress has enacted laws governing the manner of holding elections of Representatives, but there is so strong an antipathy among the people to any Federal interference with the right and exercise of suffrage, that these laws have furnished an issue concerning which there has been much bitter party contention and controversy. At the first regular session of the Fifty-third Congress, 1894, the laws giving to Federal officers direct supervision of elections for Congressmen were repealed.

The executive power is lodged in the President. A Vice-President is chosen with him, and the term of office of both is four years. There is no prohibition of re-election, and eight out of nineteen Presidents have been chosen for the second term. No President has been chosen for a third term, and the unwritten law against a third term is so strong that it is not likely that it will ever be infringed.

The President and Vice-President are not chosen by a direct vote of the people. It was the intention of the framers of the Constitution that a board of electors should be chosen who should meet and elect a President and Vice-President. The person receiving the highest number of votes was to be President, and the person receiving the next highest number should be Vice-President. This machinery for the election of President and Vice-President still exists. But its purpose was defeated at the beginning of the Government. After the expiration of Washington's second term the political parties named their candidates, and the electors became mere instruments for recording the will of the party by which they were chosen. At first the candidates were agreed upon by the Congressmen of the different parties in caucus, but now they are selected by national conventions of delegates chosen by each party in the several States in proportion to the congressional representation of each State. The voters really cast their ballots for these candidates although formally they vote for the electors. Theoretically, these electors may choose any one for President, or Vice-President, but no elector would think of voting against the candidate of his party. An attempt was made to induce Mr. James Russell Lowell to put the theory in practice in 1876, in the contest between Mr. Tilden and Mr. Hayes. Mr. Lowell was one of the Republican electors of Massachusetts. It was assumed that he believed that Mr. Til-

den, and not Mr. Hayes, had been elected. He was therefore appealed to to vote for Mr. Tilden. In effect his reply was that the old theory of the Constitution was dead not only by nonuse, but by adverse use, and that a majority of the voters of Massachusetts had given to him a commission to vote for Mr. Hayes. Consequently, in his view—a view that must be generally sustained—to have voted against Mr. Hayes would have involved on his part a breach of trust. So generally accepted is this view, that in most States the names of the party candidates for President and Vice-President are printed at the head of the ballot.

Each State chooses electors equal in number to the Senators and Representatives in Congress. In order that the electors may be free from the influence of the retiring President, or of Congress, it is provided that no Senators or Representatives, and no person holding an office of profit or trust under the United States, shall be appointed an elector. Each State, through its Legislature, may determine the manner in which its electors shall be appointed, and in our early history electors were often appointed by the State Legislature. In practice, now, all the electors are voted for on general State tickets; in other words, each voter in a State casts his ballot for the whole number of electors to which that State is entitled.

Since the framing of the Constitution the manner in which the electors shall act has been modified, so that the electors designate the person for whom they vote for President and the person whom they choose as Vice-President. They meet in their respective State capitols to cast their ballots. They make lists of those voted for as President and Vice-President, with the number of votes cast for each person, and these lists are sent, signed, certified, and sealed, to Washington, to the President of the Senate. The lists are opened by the President of the Senate in the presence of the two Houses of Congress. The votes are counted by tellers, and the result is declared by the President of the Senate. The person receiving the majority of all the votes cast for that office shall be President, and so with the votes cast for Vice-President. If no one receives a majority of the electoral votes for President or Vice-President, the duty of selecting a President is imposed upon the House of Representatives, and the duty of choosing a Vice-President rests with the Senate. The choice of the two Houses is limited. The Representatives must select from the three persons receiving the highest number of electoral votes for President, and the Senate from the two persons receiving

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the highest number of votes for Vice-President. A quorum in each House for this purpose must be two thirds: in the Senate two thirds of the whole number of Senators; in the House of Representatives members from two thirds of the States. The vote in the House for President is taken by States, the theory that the States determine governing here as in the electoral college. The delegation from each State casts one vote, and a majority of all the States is necessary to a choice. The choice must be made before the 4th of March, on which the presidential term begins. It can not be made during the term. An elector can not vote for two persons from his own State for the offices of President and Vice-President, the intention being that the two should not come from the same State. However, this is the only provision governing the subject, so that if the election should ever be thrown into Congress the two might be selected from the same State.

No one is eligible to either of these offices unless he is a native-born citizen of the United States, thirty-five years old, and for fourteen years a resident of the country. The Vice-President succeeds the President in case of his removal from office, or his death, resignation, or inability to discharge his duties. Congress is authorized to provide for the succession in case both the President and Vice-President die, resign, are removed, or are otherwise disqualified. For many years the succession went first to the President *pro tempore* of the Senate, and then to the Speaker of the House. A law was passed in 1886 providing for the succession of the members of the Cabinet as follows: first, the Secretary of State; second, the Secretary of the Treasury; third, the Secretary of War; fourth, the Attorney-General; fifth, the Postmaster-General; sixth, the Secretary of the Navy; seventh, the Secretary of the Interior. The reason for making the change was to provide a greater number of possible successors, and also to insure the succession of the same political party during the full term for which its President and Vice-President had been elected. The presiding officers of the two Houses have been frequently of the opposite political party to the Executive, but cabinet officers are appointed by the President from his own party. They are not only the heads of the departments over which they preside, but are the political advisers of the Executive, meeting with him as a body at the Executive Mansion regularly twice a week. No one of these officers, however, may succeed to the presidency unless he possesses the constitutional qualifications for election to that office.

The President executes the laws enacted by Congress. He is the commander-in-chief of the army and navy. He may grant pardons and reprieves, except in case of impeachment. He appoints the executive, administrative, diplomatic, consular, and judicial officers of the Government, with the advice and consent of the Senate, except where Congress has empowered him, or the courts, or the heads of departments, to appoint inferior officers, without the confirmation of the Senate. When a vacancy occurs during recess the President may fill it, but the commission, unless ratified by the Senate, will expire at the end of the next session of Congress. He may make treaties, but before a treaty becomes binding as the supreme law of the land it must be ratified by the consent of two thirds of the Senators who are present.

He is commanded by the Constitution to give to Congress information concerning the state of the Union, and to recommend to it measures for legislation. He does this in an annual message, sent to Congress at the beginning of its session, on the first Monday of December. He may also convene Congress in extraordinary session, and if the two Houses disagree as to the time of adjournment he may adjourn them to such time as he may think proper.

His salary is $50,000 a year. The salary of the Vice-President and of each cabinet officer is $8,000 per year. All officers of the United States may be removed by impeachment for and conviction of high crimes or misdemeanors. The judgment of the court of impeachment is simply removal and disqualification for holding office. The guilty party may be subsequently indicted.

The judicial power of the United States is vested by the Constitution in a Supreme Court, and in certain inferior courts which have been established by Congress under the authority of the Constitution. The United States courts have jurisdiction over all Federal questions, and over all causes arising under international and maritime law, and in which the representatives of foreign governments are involved; also of causes involving controversies between States, between citizens of different States, or between a State and citizens of another State, except that a State can not be sued by citizens of another State or by citizens of a foreign country. No individual can bring suit against a State except in its own courts. The United States Government, as the representative of each State in its relation to foreign countries, is responsible and must answer in an international controversy for

the conduct of the State; but it has no power to compel the State, either through its executive or judicial departments, to take such action as will remove the cause of contention, or repair an injury that may have been done to foreign countries or their citizens by the State itself or by its citizens.

Causes in the United States courts are usually begun in either a district court, which is the lowest, or in a circuit court, which is intermediate between the District and the Supreme Court. There are two appellate tribunals—a Court of Appeals in each circuit and the Supreme Court.

The Supreme Court consists of a chief justice and eight associate justices. The Supreme Court has original jurisdiction in causes affecting the diplomatic and consular representatives of foreign powers, and in those in which a State is a party. Besides appeals from the decisions of the inferior Federal courts, the Supreme Court hears appeals from the State courts where the constitutionality of a Federal law is denied by the State tribunal, or where the validity of a State law under the Federal Constitution, being denied by one of the parties to the litigation, is affirmed by the State court. In every such instance the appeal to the Federal court must be from the judgment of the highest State court.

There are nine circuit courts and sixty district courts. In the first circuit, which includes Maine, New Hampshire, Massachusetts, and Rhode Island, there are two judges. In the second—Vermont, Connecticut, and New York—there are three. In the first circuit there are four district courts; in the second there are five, three in New York State alone; in each of the other circuits there are two judges. All Federal judges are appointed by the President and confirmed by the Senate. They hold their offices during good behavior. The chief justice receives a salary of $10,500. Each associate justice receives a salary of $10,000. The salary of a circuit judge is $6,000, and the salaries of the district judges range from $3,500 to $5,000. A judge's salary can not be diminished during his term of office.

Besides these courts of general jurisdiction, Congress has established courts for the determination of claims against the Government, and of controversies concerning titles to the public lands in which the Government is involved. It has also established local tribunals for the Territories. The district courts have their district attorney and their marshals, the duties of the latter being similar to those of the county sheriff under the State laws.

General provisions of the Constitution define the relations of

the State in certain respects to the Federal Government and to one another, and the rights of individuals and citizens not only in the States where they reside but in the other States of the Union. The public records, acts, and judicial proceedings of each State must receive "full faith and credit" in every other State. Congress may prescribe in what manner such acts or records may be proved in a State court. A citizen of one State has all the rights of citizenship in every other State. He may acquire property and the right of suffrage, and he may transact business and hold office on a footing of full equality with a native-born citizen of the State. Each State is required to surrender a fugitive from justice on the demand of the Governor of the State having jurisdiction of the crime charged. In a word, while the executive and judicial jurisdiction of a State and of its laws do not operate beyond its borders, the Federal Constitution intervenes. It gives to citizens everywhere within the Union protection for their rights and property, and for the purpose of arresting criminals makes all State executive and ministerial officers aids of the authorities of the State where the offense was committed.

The Federal Government is also the protector of the integrity of the States. It is bound to defend them against invasion, and on application of the Legislature, or of their Executive when the Legislature can not be assembled, even against domestic violence. It guarantees to each State a republican form of government. The States, having granted to the Federal Government all the powers possessed by it, reserved all other powers to themselves. The restrictions upon the States are few. The people are governed by their laws. Comparatively few citizens come into personal relation with the Federal Government. They vote for presidential electors and for Representatives as they do for State officers, but the authorities with whom they deal directly are those of their township or municipalities. While they are interested in the acts of Congress, Federal taxation is not directly levied by United States officers except on a small minority of the people who are engaged in certain kinds of business. The direct taxes that are paid by citizens are those of the State.

The States may have no relations with foreign powers. They may not make a treaty or an alliance without the consent of Congress, or engage in war except as their militia serves under the call and command of the President of the United States, or unless they are invaded or in imminent danger. They may not coin money, make bills of credit, or declare anything but gold and

silver legal tender in the payment of debts. They may not lay duties on imports or exports except for executing their inspection laws. They may not pass bills of attainder or *ex post facto* laws, or laws impairing the obligation of contracts, or grant any title of nobility. Without the consent of Congress they may not lay any duty on tonnage, or keep troops or ships of war in time of peace. All these powers and rights belong naturally to the General Government, and it was the intention to limit the States to the care of their domestic affairs, while the Federal Government should have jurisdiction over foreign relations and the general welfare of all the States and the people thereof as they were united under the Constitution. Laws and treaties made in pursuance of the Constitution are the supreme law, and the judges of the State courts are bound thereby.

New States may be admitted by Congress. There are now forty-four States, thirty-one of which have been admitted from the territory ceded by the States at the beginning of the Government, or that obtained through the Louisiana purchase, that of East and West Florida, or that gained in the war against Mexico.

The Constitution may be amended. Amendments may be proposed by Congress, two thirds of each House voting in favor of them; or a convention may be authorized by Congress on the application of the Legislatures of two thirds of the States.

Three fourths of the State Legislatures, or conventions in three fourths of the States, as Congress may direct, shall ratify the amendments before they can become part of the fundamental law of the land. The Constitution provides that it may not be so amended that any State shall, without its consent, be deprived of its equal representation in the Senate.

CHAPTER XII.

INDUSTRY AND FINANCE.

THE industrial achievements of the American commonwealth have become commonplace. The extraordinary advance in population, in wealth, in mechanic arts, in the establishment of civilization in what had been, a space ago, a wilderness—these phenomena have attracted the attention of all who have watched the progress of mankind. But it is not the volume and quantity of these achievements which chiefly interest the thoughtful observer. It is their quality: the proofs which they afford as to the future of mankind, the hopes which they really justify as to the progress of the race; above all, the lessons which they teach as to the success of democracy and of self-government not only in its political but in its economic and social aspects.

We may begin with a sketch of the increase of the community in population. The growth in numbers has been unexampled in the history of the world. Since the early part of the seventeenth century the population of what are now the United States has increased at a rate probably the most rapid at which the human race can increase. A doubling of population in the space of about twenty-five years was supposed by Malthus to represent the maximum rate at which the human species could propagate. Malthus's estimate was indeed based upon the very growth which we are now considering: the rate of increase in the American colonies he supposed to indicate the most rapid advance which human society had showed. Later students of statistics, considering the physiological possibilities—the child-bearing capacity of women and the proportion of unpreventable deaths that must yearly occur—have concluded that this rate, in fact, represents the maximum; nay, have even doubted whether the increase known to have taken place in the American communities could have been maintained by natural growth, unaided by immigration. The somewhat uncertain figures which we have as to the growth of population in the colonies indicate that a population of

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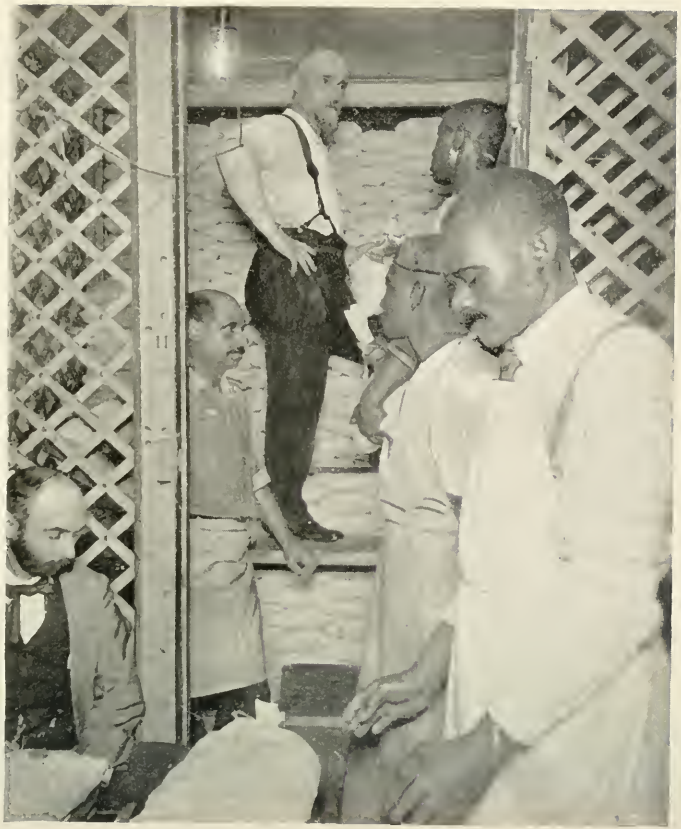

Specie Vaults, United States Treasury, Washington, D. C.

perhaps twenty-five thousand in 1640 had grown to one of a quarter of a million, more or less, by the close of that century. The growth in this period was probably at the most rapid rate known in our history; undoubtedly the gain by immigration helps largely to account for it. After the close of the seventeenth century the gain by immigration was less, and the growth took place mainly by natural increase. Before the middle of the eighteenth century the colonies numbered a million inhabitants; at the beginning of the Revolutionary War they probably numbered two and a half millions. When the Union was established, in 1789, we had, in round numbers, four million inhabitants. From that time until the beginning of the civil war the growth went on steadily—doubling, roughly, once in twenty-five years. In 1860 the census showed a population of 31,400,000. Since 1860 the rate of growth has somewhat slackened. The census of 1890 shows a population almost exactly double that of 1860; the period of doubling, in other words, has lengthened to about thirty years.* Some part of this decline in the rate of growth may be due to the civil war; and in fact the rate of increase from 1860 to 1870 was the lowest, even after making allowance for the defective enumeration of 1870, in any decade since the census returns began to be taken. But the decade from 1880 to 1890 also showed a marked slackening in the rate of increase, which probably is the beginning of a permanent relaxation in the portentous growth maintained hitherto.

Not the least interesting part of the history of our population is the relative growth by natural increase and by immigration. Especially if we consider the social and economic questions involved, it becomes important to ascertain how large a part of our population consists of fresh arrivals, and how large a part consists of descendants from the stock that has been long settled here. Undoubtedly in recent years, and especially in the last decade, a very large proportion of the increase has come by immigration. Looking at the whole sweep of our history, it is more difficult to ascertain how large a part in the growth arose from the constant inflow of emigrants from Europe. Unfortunately, no official records of immigration were kept until 1820. We know that during the seventeenth century the gain by immigration was large, while it is probable that after the beginning of the eighteenth century,

* Population of the United States, in round numbers:

1790, 3,929,000	1820, 9,634,000	1850, 23,192,000	1880, 50,156,000
1800, 5,308,000	1830, 12,866,000	1860, 31,443,000	1890, 62,622,000
1810, 7,240,000	1840, 17,069,000	1870, 38,558,000	

until far into the nineteenth, this gain was small. When the Government first began to take count of the immigrants, in 1820, we find the inflow to be small in the decade from 1820 to 1830, increasing in the thirties, and attaining large dimensions first in the decade from 1840 to 1850. The figure of one hundred thousand immigrants arriving in one year was first reached in 1842. In the latter part of that decade, after the Irish famine of 1845–'46, the movement set in on a great scale. The maximum before the civil war was reached in 1854, when 428,000 immigrants were landed. With the civil war there came a decline; but in the generation that has elapsed since then there have been three great waves of immigration marking three periods of general industrial activity—in the years 1867–'73, in 1879–'82, and lastly in 1887–'88. The absolute maximum in immigration was reached about ten years ago, in 1882, when in round numbers 789,000 strangers arrived on our shores from Europe. Looking at the last decade as a whole, the average arrivals have been somewhat under half a million persons per year.

Certain it is that our growth in population has been greatly accelerated by this steady stream of immigration. It has been estimated that in 1870 the natives (that is to say, the persons of white color descended from those who were in the country in 1790) numbered about 21,500,000, while the whites of foreign descent (that is, immigrants into the country since 1790 and their descendants) numbered about 11,600,000. If we take a more recent estimate, we find that in 1888 the natives, again white, numbered some 29,000,000, the immigrants some 25,000,000. It is probable that at the present time the numbers of the natives, and of the immigrants and their descendants, are nearly evenly balanced. If we compare, moreover, the number of the native born and the foreign born, including among natives all persons born on our shores, whether of native or of foreign parentage, the census of 1890 shows that 85.23 per cent are native born and 14.77 per cent are foreign born. All the indications are that the proportion of actual immigrants in our increased numbers is becoming greater and greater. Moreover, there are indications that the character of the immigrants, on the whole, is not improving, and probably is deteriorating. With the certainty of a less rapid growth from within, and of a less rapid growth in the total population, it certainly is a grave question whether the time has not come to check in some way the inpouring of vast numbers of fresh arrivals from the Old World.

Obviously, the foundation for the extraordinary growth and spread of population has been the vast extent of our free lands. The mode of dealing with those lands by the community has been simple enough. Our object throughout has been to get the lands into the hands of the people, and to bring new regions and new soil into cultivation as early as possible. The public lands, therefore, have been looked to not as a source of revenue for the Government, but as a means of increasing as rapidly as possible the population and wealth of the community. In the early days of the Federal Government, it is true, the public lands were looked upon as a source of revenue, and as a means of paying off the public debt; but before long a different policy was adopted. The pre-emption system in 1841 made it possible to secure public lands at a minimum price (which still remains ordinarily one dollar and a quarter an acre), on the simple conditions of residence and occupation. The homestead system established in 1862 made it possible for settlers to procure a title to land, free of any payment except that of a nominal fee, on the ground of actual settlement. Looking over the whole period of our national history, the public lands, so far from being a source of revenue to the Government, have been a source of expense. The total receipts of the Federal Government for its public lands in the course of the last century have not exceeded $250,000,000, while a sum much greater has been spent on them, if we consider not only the cost of survey and administration, but the cost of extinguishing Indian titles, not to mention the cost of Indian wars. The community, in short, has taxed itself for the purpose of getting lands rapidly into the hands of private owners. The keynote to our policy here is the same that runs throughout our industrial history: production, growth, acquisition, have been the primary objects, while the problem of distributing the accumulation of wealth has been allowed to take care of itself with a confidence perhaps too serene.

The golden period in which we had unlimited quantities of fertile lands to put into the hands of any who chose to come, has now nearly, if not quite, reached its close. The total territory which the Government of the United States at one time or another had at its disposal amounted in round numbers to 2,700,000 square miles, or about 1,730,000,000 acres. Of this there had been disposed of by 1890, in round numbers, about 750,000,000 acres, leaving in the hands of the Government about 1,000,000,000 acres. But of this apparently handsome surplus a very large part—some

340,000,000 acres—is in the Territory of Alaska, of very doubtful value for industrial purposes; while of the remainder, hundreds of millions of acres consist of desert or mountain lands which will never be valuable for agricultural purposes. No doubt there are great tracts of good land left in the hands of the national Government; and there are more which, while parted with by the Government, have not yet been brought into effective cultivation by the owners. Nevertheless, the fact must be faced that, comparatively speaking, our magnificent public domain has shrunk to small proportions. We have no longer fresh land in unlimited quantities upon which to turn an increasing population. The conditions of the future must be different from those of the past.

The westward flow of population and the absorption of the public lands have been possible only by the concurrence of the other factor referred to a moment ago—the advance in the art of transportation. That advance deserves a full consideration, for no aspect of the economic activity of the American people is so typical. Not only has the growth of easy, cheap, and rapid transportation been an indispensable factor in enabling the growth and spread of population to take place, but the good and evil in our industrial achievements have alike shown themselves most strikingly in the development of our highways, of our canals, and especially of our railroads.

The history of transportation in the United States—in large part the history of the industrial advance—divides itself into three periods: the turnpike period, the river and canal period, and the railway period. The first two run into each other. Before the turnpikes had fairly begun to be established and to work out their effects, canals came in, partially to displace them and partially to supplement them; while at the same time the development of the steamboat made river navigation an important part of the system of transportation by water. By the middle of the century railways began to exercise their full effects, and a struggle for supremacy between the railway and the canal set in. In a few years it was seen that the railway must conquer. Canal building ceased; railway building progressed with portentous rapidity, and the advance of railways became almost identified with the advance of population and of wealth.

On its good side and on its evil side the railway experience of the United States is typical. The evils are sufficiently obvious. We have had rapid building of railways, but we have had also overbuilding of railways. Not only have railways been built in

advance of the needs of the community, but in some cases they have been built beyond any probable needs. Parallel lines of railway have been built where one would suffice. In other words, part of the community's capital has been wasted. Other evils are equally striking. The speculative character of American building and management has been the cause of the worst of them. That speculative character is sometimes spoken of as if peculiar to railway operations; in truth, it is only one manifestation of the temper of the whole community. But for the existence of a great moneyed public ready to invest in new enterprises, willing to take great risk for the possibility of large losses, hungry for the accumulation of fortunes without labor, eager for buying and selling and speculating, these evil sides of American railway experience would never have been encountered. Stock-jobbing and stock speculation have found their most fruitful field in railway enterprises simply because the securities and management of great railway corporations lend themselves with particular ease to speculative dealings. The gambling spirit is doubtless inevitable in any community rapidly advancing in wealth, presenting the possibilities of large fortunes, and opening fruitful opportunities for the shrewd, the reckless, perhaps the unscrupulous. But certainly the development and the continuance of that spirit is one of those aspects of the national experience of the last century which are least agreeable in the eye of the social philosopher.

So much as to the evil side of affairs. What is there of good to weigh in the balance? The same causes which have brought the evil have brought also the good, and it is difficult to see how we could have had the one without the other. We have had, it is true, overbuilding of railways and waste of capital in the construction of unnecessary lines. But we have also had a greater abundance and variety of railway service, a greater railway system, and greater cheapening of transportation than any other community.

We have noted that the existence of unlimited areas of new land, and the steady advance of the population to new territory, have been the salient events in that progress. Agriculture, therefore, has always been the chief occupation of the people. The successive censuses show that, while the proportion of the population engaged in agriculture has tended to decline in the successive decades, it has still remained the basis of our industrial life. Not only has it been the chief occupation of the people, but

it has been the chief occupation of the American proper, of the native-born citizen. Where the census has taken account of the occupation of the people it has found that the proportion of the native born has been highest in agriculture. Thus the census of 1880 (which as yet, unfortunately, we can not supplement by figures from the census of 1890) showed that of the total number of native-born persons working in gainful occupations in the United States, very nearly one half—or forty-nine per cent—were engaged in agriculture. Among the foreign born, the proportion has been uniformly less. Thus, according to that census, only twenty-eight per cent of the German-born persons making their living in the United States were engaged in agriculture, only twenty-two per cent of the British-born, and only fourteen per cent of the Irish-born. The only nationality which approached the American in the proportion of agriculturists was the Scandinavian, of whose members forty-five per cent tilled the soil.

There are certain peculiarities of our agricultural operations to which it is worth while to direct attention. The tendency has been to concentrate the attention on certain great staples: wheat and corn and the cereals in the North; cotton, rice, and sugar in the South. In the production of these commodities extraordinary advances have been made and extraordinary results have been achieved. These results have been due not merely to the abundance and fertility of the soil, but in great part to the industrial qualities of those who tilled it.

American agriculture, like American railways, has been marked by its adaptation to the peculiar needs and conditions of the country. In the language of those who write on agricultural history and theory, it has been not intensive, but extensive. Like the American railway, it has spread its operations thinly over a great deal of land, instead of concentrating them upon a comparatively little land. In the early part of the century visitors from Europe, and more particularly from England, were struck by the slipshod character, as they called it, of American agriculture; by the poorness of the cultivation, the meagerness of the crops, the rudeness of the buildings and inclosures, the waste of manure, the failure to return to the soil what had been taken from the soil. American writers on agriculture have sometimes echoed these complaints, and blamed the American farmer for his wasteful treatment of the soil. But in truth the American farmer was adopting the methods which were most advantageous for a community having an abundance of land and not obliged to confine its opera-

tions to a comparatively small number of acres. The important question was not in what way the farmer could get the greatest amount of produce out of a given number of acres, but how he could get the most out of a given amount of labor. Where land was unlimited it paid better to raise ten bushels of wheat to the acre on fifty acres, than twenty-five bushels to the acre on ten acres. The husbandry might not get all out of every parcel of land which it could yield, but it got the utmost out of a given application of labor and capital.

These conditions inevitably change as population thickens on the one hand, and as the richness of the soil is exhausted on the other hand. The system of continuous cropping for one staple commodity must give way to a system of rotation of crops, greater use of manure, and more careful and varied culture of the soil. This transition has accomplished itself to a very considerable extent in the Eastern States, as in New York, Pennsylvania, and Ohio. It is now beginning to accomplish itself in the States of the Mississippi Valley. In the States of the far West the lands are cultivated now as the lands of Indiana and Illinois were cultivated a generation ago, and those of Ohio, Pennsylvania, and New York were cultivated two generations ago.

But the abundance of the soil, and the conditions under which that abundance could be made to yield the largest crops, have not alone determined American agriculture. Fully as important a factor has been the use of machinery, especially in raising those staples for which the new and abundant lands were best adapted. There is no branch of industry in which the ingenuity and enterprise of the American nation have been so strikingly manifested as in the invention of agricultural implements. Mowers, reapers, binders, plows, cultivators, harrows, and an endless variety of agricultural implements, have affected the character of American agriculture, and bid fair in time to affect greatly the agriculture of the entire world.

The same factor has counted for much in the other important branch of productive industry, manufacturing, to which we may now turn. While agriculture has always been the most important of the national industries, manufacturing industry has shown a steady and significant growth. The proportion to the population engaged in manufactures has grown from decade to decade, and the time may not be far distant when the United States will be no longer a distinctively agricultural country. Especially in the last twenty years has the growth of manufactures been rapid

—a result no doubt due in part to the policy of high protection followed during that period, but probably due in larger part to factors of a less artificial sort, such as the discovery of new mineral resources, and the further development of mechanical skill and genius.

Broadly, our manufactures can be divided into two great groups. In the first group are the industries most distinctively American, in which this country has been the pioneer in new inventions, new processes, new commodities. In the second are industries in which we have in the main followed rather than led, and have adopted processes invented elsewhere, often with improvements and modifications, yet without departing radically from known paths. A sharp and clear-cut line of demarcation between these two classes can not indeed be drawn. Some industries present the marks both of daring invention and of inert imitation. Nevertheless, the division serves to mark two distinct aspects of our manufacturing career.

The characteristic feature of the first group is that the American mechanic and inventor has not only hit upon new ways of making old things, but has conceived the idea making things never made before. He has not merely pushed further on paths already entered; he has struck out on paths of his own. Especially in making tools for lightening labor he has produced a host of novelties. We have already referred to agricultural implements and machinery, to the thousand and odd new tools which have lessened the labor of the farmer and at the same time have doubled his efficiency. Another familiar case is that of the sewing machine, now a household friend in every civilized community. Another is the improvement—fairly to be styled a revolution—in the manufacture of firearms, which, oddly enough, was developed in a time of profound peace. American rifles, muskets, and revolvers were exhibited with triumph in the London World's Fair in 1851, their manufacture having been perfected in the course of the thirty years preceding, when hardly a shadow of war had rested on the country. The further perfecting of firearms was soon undertaken in European countries, where they were necessary though deadly tools; but the impetus was given and the way shown in this country. Still another important invention, to be classed with the agricultural implements, is the cotton gin, invented by Eli Whitney before the close of the last century, by which alone the cultivation of cotton on a great scale was made possible.

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Chicago Stock Exchange.

Other cases in which striking advances have been made in making old things in new and cheaper ways, are typified by the wooden clock and the American watch. The wooden clock came first in time, being made in the early years of the century in Connecticut, and soon so rapidly and so wonderfully improved that before the middle of the century it began to be exported from the United States to all parts of the world. The making of watches began somewhat later, about the middle of the present century, and it has chiefly developed in the period since the civil war. In both cases new machinery and new processes have made possible the production of accurate timepieces at a price which puts them easily within the means of all.

In all those tools and machines one feature has appeared, again a distinctively American contribution to the arts of production—the system of interchangeable parts. By making each piece in an intricate machine precisely like the same piece in every other machine, the wide use of complicated instruments became possible in a degree not to be thought of when every injury had to be repaired by a mechanic on the ground. Where parts are made interchangeable, a broken piece can be replaced with absolute accuracy by simply sending to the maker for its duplicate. This simple and far-reaching plan seems first to have been adopted in the making of firearms in the United States. It was extended rapidly to every sort of tool and machine, and has now become of well-nigh universal application.

In the cases mentioned so far, the successes achieved have been in making new tools, rather than in new ways of making finished commodities. It is in the invention of such new devices that American ingenuity has won its greatest successes. On the border line between tools and finished commodities are such articles as household hardware, door knobs, handles, hinges, builders' hardware, in which the American mechanic and manufacturer have easily distanced all foreign competitors. The same is the case with a multitude of articles for household use, such as the wringing machine, which has lightened the labors of millions of housewives and house servants, and those countless devices for the kitchen, the laundry, and the storeroom which make so great an impression on our European cousins when first they see them. In making all sorts of wooden ware the advance in methods of production has been equally wonderful. Doors, sashes, blinds, moldings, window frames, and all the details which make possible our cheap wooden houses; furniture for the house after it is fin-

ished—these have been among the triumphs of American invention.

In another direction our cheap, neat, and effective pressed glassware, like its less peaceful companion the firearm, has surprised the world at successive international exhibitions in London, Paris, and Vienna.

The question has sometimes been asked how far these great advances in the arts have been due to our patent system. Legislation for securing to inventors profits for their inventions was among the first fruits of the Constitution, the Patent Act being passed in 1790. And our patent legislation has been not only timely but effective. From the first, the inventor and patentee has had a strong position in the courts, the patent giving him a surer standing than that which England gave the English patentee. The establishment of a permanent Patent Office in 1836, in which inventions are carefully scrutinized, classed, recorded, and subjected to a rigid examination by the Commissioner of Patents, serves to render the system still further effective. The number of patents granted has, in consequence, been enormously large; and the evidence unquestionably indicates that the patent system in the long run has accomplished the object for which it was designed—that of stimulating invention, and in the end making the community more easy and more prosperous. But here, as in so many cases, we find an interaction of cause and effect. The general high range of mechanical capacity has been a factor quite as important as the legislative protection of the patented invention. The wide diffusion of ingenuity and skill doubtless explains why the protection of the patent was so freely and effectively given by the Legislature; while that protection in turn has still further stimulated invention.

The second group of manufactures, to which reference has been made, is marked by a greater imitation of foreign methods and is perhaps best exemplified by the textile industries. The epoch-making inventions in spinning and weaving are chiefly of foreign—predominantly of English—origin. Cotton spinning, the first and decisive advance, came to us from England, and was firmly established there before a beginning was made in this country. It is true that the manufacture of cotton goods developed in the United States at a comparatively early stage, being firmly established before the beginning of the third decade of this century. It presents, too, a case in which the industry, once established, has not lagged behind its foreign competitors. Prog-

ress in the cotton manufacture has been rapid and steady, and for the last half century the industry has been abreast, if not ahead, of the cotton manufacture abroad. Nevertheless, as compared with the manufactures of the sort described in the preceding paragraphs, our progress has been by no means striking. The same remark may be made of the woolen manufacture, whose development also came later in time than its development abroad, and which has made less advance, absolutely and comparatively, than the cotton manufacture. As to cheaper goods, the woolen manufacture has indeed made some marked advances; but for finer and dearer goods we still look abroad for our supply. The manufacture of silks presents a peculiar case. It came late, being developed in the period since the civil war; and it grew only in consequence of high protective duties. But, once introduced, great progress has been made in it; new methods and new machines have been adopted; and the industry, while beginning in imitation of foreign ways, has struck out new paths, and bids fair to present another example of the triumphs of the Yankee mechanic.

The textile manufactures illustrate a phase of our industrial history to which some reference has already been made, namely, the effects of foreign immigration and the influx of foreign operatives. In discussing our agricultural history it was pointed out that agriculture has been distinctively American. The foreign element has betaken itself largely to manufactures, and among manufactures chiefly to those of the second group now under consideration. In those manufactures in which American genius has worked out paths of its own, the workmen are still chiefly American; or, if foreigners, they are foreigners of the second generation, born upon the soil and bred amid American influences. The foreign operative and mill hand has found his place mainly in the industries in which the foreign lead has been followed. This has not always been the case. Fifty years ago a New England cotton mill was filled with the daughters of New England farmers, a manufacturing class very different from that which now fills the factory towns, and one justly celebrated by the foreign traveler of those days. But within the last half century the native has been displaced by the foreigner in the textile industries, and in a great number of other manufactures allied to them in character. First came the influx of Irish and British; later that of the French Canadians.

The explanation of the difference between these two groups

of manufactures as regards the character of the working population is not difficult to find. In the textile industries the work consists largely of simple routine labor, chiefly the mechanical tending of machines. It does not call for that high average of skill, attention, and trustworthiness which is needed in industries of the first group. The newly arrived foreigner is not equal to the intricate tasks imposed by the distinctively American industries, and he finds his place in those others more closely allied to the industries of his home. By what may be called a process of natural selection, the native American has found his way into those occupations in which his industrial qualities count to the utmost. The immigrant has done the heavy work of manual labor in the streets of our cities, in building our railways, in lifting the pick and the spade for us; and he has also betaken himself to those manufactures which call for unremitting labor rather than for quick intelligence. No one can doubt that this differentiation has been an economic gain to the country and an advantage to the native born; but it may be a question whether the gain may not be outweighed by the social difficulties which arise from the accumulation of the immigrants in trades and cities of their own. However this may be, the growth of many manufactures has been made possible only by the large supply of newly arrived laborers, willing to undertake for moderate wages tasks which the native has abandoned to him. The advance of manufactures has often been ascribed to the policy of protection; and though industries of our first group have been little influenced by this policy, those of the second group, no doubt, have been stimulated into larger growth than they would have otherwise attained. But a factor quite as important has been the steady influx of labor from abroad, which alone has made it possible for many great establishments to secure a steady supply of cheap labor, not of the highest industrial quality, yet sufficiently skillful for their purposes.

The present conditions of the iron manufacture in the United States are peculiar, and in some respects supply a signal instance of the departure by Americans from the traditional methods of production. It is usually said that the iron manufacture can develop only where the coal and the ore are close together, and that if any transportation takes place, it will consist in carrying the ore to the coal rather than the coal to the ore. But in the United States coal and ore which are thousands of miles apart are brought together, and each is moved halfway. The city of Chicago, far

distant from coal supplies and from ore supplies, is nevertheless the seat of a great iron industry; the ore from Lake Superior and the coal from Pennsylvania there meet halfway. Other lake ports, like Cleveland and Toledo, present the same phenomenon. The enormous cheapening of transportation by rail, and the fortunate accident of water transportation by lake, account in large part for this marvelous development. Meanwhile, there has also been a rapid development of the iron industry in the South, where the normal conditions of coal and ore in close proximity are found. Between the development in the region from Pittsburg to the lakes and the development in the South, the iron industry has advanced with extraordinary rapidity in the last twenty years, and has finally put the United States at the head of the iron-producing countries of the globe. Ten years ago the production of pig iron in Great Britain was still nearly double the production in the United States, and until within three years Great Britain had maintained her place as the greatest producer of iron. But the production in Great Britain has, upon the whole, stood still, while that in the United States has steadily and rapidly advanced. In the year 1890, for the first time, Great Britain no longer held the lead. In that year the United States produced 9,200,000 gross tons of pig iron; Great Britain produced only 7,900,000. The relation is not likely to be reversed. The United States now stands firmly as the greatest iron-producing country in the world.

In the discussion of this development, as in that of manufacturing industry at large, too much stress has been laid on the protective system and on the effect of protective duties. The extraordinary growth of our crude iron industry in the present generation has been due chiefly to the thickening of population in the West, to the discovery of new and rich supplies of coal and ore, to the cheapening of transportation which has made it possible to bring ore and coal together—in a word, to causes not likely to be greatly retarded or advanced in their operation by legislation of any sort. The probable effect on the future is not difficult to see. Iron is the basis of manufacturing industry. The country which is the greatest producer of iron and coal is likely in time to become the greatest manufacturing country. The ingenuity, energy, and restless activity which characterize American enterprise are likely to find in the near future their most promising field in our mineral resources, and in the manufacturing industries which rest on them. As long as there is still an

abundance of fresh fertile land, our energies are likely to be directed toward subduing it; and our most important industry will be agriculture, combined with those arts of transportation and of manufacture which are most closely connected with agriculture. But as time goes on, as population thickens, and as new land becomes scarce, another outlet must be found; and it will be found in manufactures. The end of another century will have a tale of industrial growth to record which will probably differ very greatly from that of the century now past.

A set of questions entirely different from those discussed in the preceding pages presents itself in the dealings of the American people with the problem of currency and finance. These also are part of our economic history, but it may be doubted whether they can figure in our list of economic achievements. They are mainly questions not of individual enterprise or of industrial activity, but of legislation. Here, as in other parts of our history, we find that while the individual has achieved wonders, the community, acting through its elected representatives, has had experiences which do not always warrant boastful congratulation.

I have said that these are problems of currency and finance. By currency I refer chiefly to legislation on money; by finance, legislation on the raising of the necessary revenue. On the monetary questions we have had a varied and not always satisfactory experience. In the matter of national revenue we have been more successful. The abounding resources of the community, and the ease with which taxes, however ill arranged, could be made to secure abundant revenue, have ordinarily sufficed to make the financial position of the Federal Government an easy one.

In the early days of the republic, the Federalists, by whom the framework of the Government was constructed and the foundations for its working were laid, attempted to establish a monetary and financial system very different in character from that which developed in later times. They created the first Bank of the United States, chartered in 1791, which was to be the fiscal agent of the Government, and was also to supply the community with the paper currency which it needed. It was modeled on the Bank of England, and, like many of the other Federalist institutions, was English in spirit if not in its actual working. At the same time the Federalists established, for obtaining the national revenue, not only a system of duties upon imports, but one of

internal taxes, which they meant to be a permanent part of the revenue system.

Most of this apparatus, however, was swept away when the Republicans, the precursors of the Democrats of our own day, came into power. The democratic spirit which took control of the government with the accession of Jefferson to the presidency was opposed to the firm and, as it was supposed, monarchical system which the Federalists had established. The internal taxes more particularly were obnoxious, and were abolished in 1802, very shortly after the followers of Jefferson secured control. The bank's charter had to be allowed to run out; but when the twenty years for which it had been granted came to an end, in 1811, the bank disappeared. The customs duties alone were left, and became the sole important source of revenue. The foundation was so laid for the policy which has distinguished the Federal Government ever since—that of relying in ordinary times on import duties as the main source of national revenue.

This change of policy must be judged by the dispassionate student of our own day very much as are the other measures of Jefferson, Madison, Gallatin, and their fellows; his sympathy is with the spirit of the Republicans, but with the acts of the Federalists. The love of the Republicans for a free, untrammeled Government, for light and unvexatious taxation, for the minimum of interference with the people's doings, for a simple, loosely organized state of society, will be shared by all of us. But for the exigencies of practical affairs the legislation of the Federalists was undoubtedly preferable. This was strikingly shown at the outbreak of the War of 1812. Foreign trade then ceased almost entirely; duties on imports consequently yielded no revenue. The internal taxes had been abolished, the Treasury was bare. At the same time, the Bank of the United States no longer existed; there was no fiscal agent which could aid the Government in tiding over the serious exigency. The consequence was, that before the War of 1812 came to an end the Government was practically bankrupt. Borrowing was resorted to, but with little success. The internal taxes were reimposed, but not in time to secure the revenue needed for the war; and they were repealed, it may be added, almost immediately after the close of the war, when the financial situation was no longer pressing. During the war they yielded practically nothing, and the Government barely escaped the last desperate resort of an issue of irredeemable paper, with all its train of evils.

From the close of the War of 1812 until the beginning of the civil war in 1861, currency questions were more important than those of revenue. The problems of revenue and finance caused few complications. The duties upon imports were relied upon as the main source of revenue, and during the greater part of the period yielded enough to meet the federal expenses with ease. There was indeed one period of embarrassment, in the years from 1837 to 1841; but in the main the difficulty of this period was how to prevent an excessive revenue rather than how to get a sufficient one. With the question of protection and the effect of import duties on the industrial progress of the community we are not here concerned. That subject was actively discussed throughout the period, and presents a set of questions very different from those relating to our financial experiences.

So far as the currency went these years present a checkered history. The second Bank of the United States was established in 1817, partly because the experience of the War of 1812 had demonstrated the usefulness of such an institution. But the second bank, like the first, lasted only through the twenty years for which its charter was originally granted; it disappeared in 1837. It became involved in the political contests of the time, and the struggle between President Jackson and the bank is one of the famous and dramatic episodes in our political history. In that struggle it is probable that some blame belongs to both parties—the greater part of the blame, perhaps, to Jackson and his party followers. But it was made clear that a fiscal institution intimately connected with the national Government, and meant to exercise an important if not a controlling interest over the credit system of the country, was not adapted to our political conditions.

During the greater part of the time in which the second United States Bank was in existence its notes were an important part of the paper money of the community, and on the whole formed an excellent paper currency. Side by side with it there existed State bank notes. After the final disappearance of the United States Bank, and the failure of some attempts made by the Whigs to re-establish another bank in its place, notes issued by State banks became the only form of paper money in use by the community. The Federal Government simply undertook to coin gold and silver—in practice coined gold only—and had nothing whatever to do with paper substitutes for specie. This system can not be said to have worked well. The State bank notes

New York Stock Exchange.

continued to form by far the most important part of the every-day money of the community. They were issued under varying conditions of regularity and safety. In New England and in New York they were generally issued wisely, with adequate legislation to secure their redemption and to prevent excessive issues. In other parts of the country the situation was much less satisfactory. Legislation was loose, and speculative banks, familiarly known as "wild-cat" banks, were common. The notes issued by the State banks were thus of variable value, and many of them were subject to a considerable discount. The currency of the community was of uncertain quality and value, and commerce was hampered by the lack of a uniform medium of exchange.

The civil war marks an epoch in our financial legislation, as it does in our political and in our industrial history. An entirely new monetary *régime*, a new banking system, a new machinery for raising revenue, a great national debt, were among the results of that convulsion. When the war began, the Government was slow to tax. It was supposed that the war would be short; and there was also a fear among the political leaders of alienating support in the Northern States by a resort to heavy taxation. There can be little doubt that in fact the people were enthusiastic in support of the Government and of the Union, and would have cheerfully borne taxes, however heavy; but the lack of confidence in the people, and the lack of experience in financial matters, caused a series of mistakes and failures in the financial conduct of the war. Taxation being resorted to but sparingly at the outset, borrowing had to be attempted. But the financial situation was not such as to make borrowing easy; and, in any case, the Government did not offer a rate of interest on its securities sufficient to tempt lenders. Meanwhile the expenses of the war mounted portentously; the Treasury was almost bare of resources; and under the stress of an emergency which more prudent and far-sighted legislation might have prevented, the issue of irredeemable paper money was resorted to. In 1862 and 1863, $450,000,000 of United States notes—greenbacks, as they were familiarly called—were put forth. The quantity was so excessive as inevitably to lead to the depreciation of the currency. Gold went to a premium, and the country started on a period of irredeemable paper currency and inflated prices which lasted until the resumption of specie payments in 1879.

As the country may be said to have drifted into the issue of the greenbacks, so it may be said to have drifted into its great

national debt. The greenbacks were soon spent or exhausted. Taxes were still not levied on a scale to yield the enormous revenue needed for the war. Accordingly, the Government borrowed, in any and every possible form. The simplest, the cheapest, the most effective way of borrowing would have been to issue bonds. But a prejudice against creditors, and against what was supposed to be the speculative influence of Wall Street, prevented the Government from issuing its bonds frankly and openly at such terms as to attract investors. The simple fact was, that the United States wanted to borrow enormous sums; that its credit, especially during the early years of the war, could not be very secure; and that it had to offer a good rate of interest in order to obtain funds. But the inexperience and prejudice of the leaders, and in good part of the people also, made them unwilling to offer a sufficient rate of interest. During the greater part of the war bonds were put upon the market at terms which made it difficult, sometimes impossible, to sell them. Consequently all sorts of temporary and haphazard devices were used to tide over the difficulties. The Government borrowed great amounts on short time at a high rate of interest, issued certificates of indebtedness, sold Treasury notes, interest notes, and compound interest notes; and resorted, in fact, to every variety of expensive and unsatisfactory device. It lived from hand to mouth, was ever in straits for money, and came perilously near a complete financial collapse in the closing year of the war.

When once the struggle was over the situation cleared. In the very last year of the war, taxation at last had been resorted to on a great scale. In 1864 customs duties were greatly raised, and a system of internal taxes, which had already been begun in 1862, was put into a form in which it would yield a large revenue. But in this case, as in the earlier case of the War of 1812, the resort to taxation was undertaken too late; the revenue did not accrue in large volume until after the pressing emergencies were over. Nevertheless, the large sums secured from taxation after the war made the settlement of the debt much more easy. The various temporary loans were soon consolidated into a bonded debt, the interest upon which was easily met; for by the time the war ceased, the taxes became highly productive of revenue. Indeed, when the war expenditures came to an end revenue became redundant. The Government had enough not only to pay the interest on the debt, but to begin paying off the principal, and yet be in a position to reduce the war taxes.

Among the achievements in our financial history of which we may be proud is the disposition which we have made of the bonded debt. That debt has been reduced with a rapidity unexampled in the world's history. No other community ever accumulated so large a debt in so short a time; no other community ever set to work to pay off that debt so promptly and so effectively. At the close of the war the interest-bearing debt was a trifle less than $2,400,000,000, entailing an annual interest charge of more than $150,000,000. By the year 1892 the interest-bearing debt had been reduced to $585,000,000, while the interest charge upon it was less than $23,000,000. The overflowing revenue of the Government has enabled the principal to be paid off fast, while the improving credit of the Government has enabled the rate of interest to be reduced on the debt left outstanding.

This achievement—a great and unexampled one—is due, however, not so much to careful and far-sighted legislation as to the extraordinary growth in the wealth and in the resources of the community. The revenue has been large; it may be fairly said, unexpectedly and unintentionally large. It has been obtained chiefly from duties upon imports. The growth in wealth and industry has made the imports great, while the duties have remained heavy. The revenue, consequently, has been more than sufficient. The rapid reduction of the national debt has been due chiefly to that restless energy and enterprise which have built up the numbers and the wealth of the community. It has been due in but small degree to skill or competence in legislation.

Some other phases of the revenue situation may be briefly referred to. It was said a few moments ago that at the close of the war an elaborate system of internal taxes was built up. That system was swept away shortly after its establishment. For a few years it yielded very large sums; but as the revenue became redundant, the first source which was cut off was the internal tax system. A great mass of taxes on commodities, income taxes, taxes on gross receipts, license taxes, were swept away, and the only part of the system that was retained was in the taxes upon spirits, beer, and tobacco. These taxes still exist, and form the only portion of the internal revenue system which was permanently retained. They furnish a large and steady revenue from a source as unobjectionable as any means of taxation can be, and apparently the American people have learned from their varied experience wisdom enough to retain permanently these features of the fiscal system.

So far as duties upon imports are concerned, the war measures led to the development, in part unexpected, of a high protective system. Here, too, great reductions in taxation have been made, but they have been confined to taxes of one special sort. All those which operated simply as revenue duties were swept away, while those which operated as protective duties were retained. The decisive step was taken in 1872, when the duties upon tea and coffee were finally removed. Another important and far-reaching step was taken in the tariff act of 1890, when the duty upon sugar, which had also been in the main a revenue duty, was removed, and that important source of income was done away with. On the other hand, the protective duties, which also had been raised during the war for the purpose of increasing the revenue from taxation, have been retained, and in many cases have even been increased. By this double process the strongly protective system came into being.

We turn now, in conclusion, to a consideration of the currency history of the country since the civil war. The central point in this history has been the struggle, almost continuous, between those who demanded an enlargement of the volume of the currency on the one hand, and those who, on the other hand, desired to keep its volume within bounds that would insure redemption in gold and the maintenance of the gold standard. Whenever a decisive vote has been taken on the question the inflationists have been beaten. Whatever the temporary favor of their mode of dealing with the money of the country, the good sense of the great body of the citizens has eventually triumphed, and the currency has been put firmly on a specie basis. The inflationist movement has revived again and again, and has been beaten as often.

Reference has been made in the preceding pages to the great issue of paper money during the civil war. The first issue of $150,000,000 of legal-tender notes was made in February, 1862. A second issue of the same amount was made in July, 1862, and a third in March, 1863, making a total of $450,000,000 of United States notes, or greenbacks, put forth in a little more than a year. This was much in excess of the currency which had been previously circulated in the North. The total amount of currency in the North at the beginning of the war was probably less than $300,000,000. But the issue of greenbacks was by no means the only mode in which the currency was inflated. In addition, some interest-bearing legal-tender notes were issued; and a considerable volume of State bank notes remained in circulation through

the greater part of the war, which, as they disappeared, were replaced by the national bank notes. In the period between 1862 and 1865 it is safe to say that the currency of the loyal parts of the Union was doubled in volume. The result was the great rise in prices, for which the term "war prices" has become traditional. Gold went to a premium, and, in the latter part of 1864 went as high as 250; it required $2.50 of paper to buy $1.00 of gold. The currency was depreciated to less than half of its nominal value.

Nobody expected at the time that this state of things would be permanent; nor indeed was it expected that the Government paper money would under any conditions form a permanent part of the circulating medium. The national banking system, while adopted during the war very largely as a means of securing a ready market for United States bonds, by compelling the banks to buy these bonds as security for their notes, was also established as a means of providing permanently for the paper currency of the community. The Government notes, or legal tenders, were regarded as a temporary expedient—a war measure. Before the war the community had used State bank notes for all every-day transactions, and it was expected that when the stress of the conflict was over, bank notes again would become the every-day circulating medium—issued, however, by national banks instead of by State banks. In 1865 two steps were taken which emphasized the expectation of Congress and of the community that national bank notes should come into universal use, and that the greenbacks should disappear. A tax of ten per cent was imposed on bank notes issued by State banks. That tax was prohibitory; it virtually wiped out the State bank notes, and compelled such State banks as had not yet come into the national banking system to do so if they wished to retain the privilege of issuing notes. Next, in December, 1865, the House of Representatives passed a resolution to the effect that "this House cordially concurs with the views of the Secretary of the Treasury in relation to the necessity of the contraction of the currency, with a view to as early a resumption of specie payments as the business interests of the country will permit; and we hereby pledge co-operative action to this end as speedily as possible."

The Secretary of the Treasury referred to in this resolution was Mr. McCulloch, who had been appointed by President Lincoln on his accession to the second term, and had been retained

by President Johnson after the assassination. Mr. McCulloch endeavored at once to diminish the volume of the legal-tender notes, and so to contract the currency and make possible the resumption of specie payments. The extra issue of interest-bearing legal-tender notes over and above the $450,000,000 of greenbacks was promptly and quickly got out of the way. In addition, a beginning was made in retiring the legal-tender notes proper. But soon Secretary McCulloch met with opposition in his policy of contraction. The process of reducing the currency was inevitably accompanied by a fall in prices, and the fall in prices was felt to be a hardship. Such a result was inevitable. The first stage of the issue of paper money, bringing about a rise in prices, brings apparent prosperity; times seem to be good, and all the world wishes that this delightful state of things should continue. But when matters have once settled down, the exhilarating appearance of rising prosperity ceases; the cry is always for more, and for an indefinite continuance of the process of inflation. So the drunkard asks for more and more, until the last stage is reached, and the slow and painful process of return to sobriety must be undergone. The more prompt and thorough the return to a sound currency, the less will be the suffering; and every attempt to stave off the sober and simple conditions of every-day life merely serves to prolong it.

When the country endeavored, in 1865, to get rid of the depreciated paper, the process inevitably caused discomfort; but it would have caused less discomfort if it had been gone through with quickly and once for all. But this Congress would not permit. Within a few months after the passage of the resolution indorsing the policy of contraction and resumption, Congress, in April, 1866, put a limit to the process of contraction. By a joint resolution of that date it was provided that, in the period of six months after April, 1866, only $10,000,000 of legal-tender notes were to be withdrawn, and that after these six months they were to be retired at the rate of not exceeding $4,000,000 a month. It will be seen that Congress had not yet reached the stage of forbidding entirely the contraction of the currency, still less of calling for its expansion. It provided only for a slow rate of contraction. Nevertheless, this measure marks the beginning of the struggle for the maintenance of the depreciated paper currency, and eventually for its further inflation, which lasted for ten years.

Soon the inflationist movement appeared. As the volume of

United States Sub-Treasury, New York.

the currency, upon the whole, remained stationary, the transactions of the community and the prices of commodities accommodated themselves to this quantity of money. As people became used to the level of prices so brought about, it became harder and harder to reduce the quantity of money, and so cause a lower range of prices. The longer the currency was allowed to remain without appreciable reduction in its volume, the more difficult it became to make a change. Lower prices are an undoubted and real hardship when a *régime* of higher prices, even though of prices fictitiously higher, has preceded it for any length of time; and the longer contraction was delayed, the more difficult became the return to resumption and to a sound currency. On the other hand, as prices settled down to a comparatively uniform level, the exhilarating effects of the first issue disappeared, and the clamor was for more. The inevitable depression which followed the war—a depression which meant that the community was feeling the effects of the enormous losses and expenditures of the great struggle—was ascribed to deficiency in the currency. The cry arose for issuing more paper money as a means of alleviating the distress. In February, 1868, this feeling gained such strength that Congress was led to put an end entirely to the process of contraction, and to fix the volume of the legal tenders at the amount which then was outstanding ($356,000,000).

We need not stop to consider all the events of the inflationist controversy of the years from 1866 to 1875. The chief battle-ground was the State of Ohio, where the inflationists and the sound-money men were almost equally divided, and where the contest between them was bitterly fought in successive elections. The height of the inflationist movement was reached after the crisis of 1873. In September of that year came the great crash, involving the failure of a large number of banking and business houses, and marking the beginning of a period of depression which lasted till 1879. The speculation of the years 1870–'73, and the crisis of 1873, were due in good part to the excessive quantity of the currency, and to the spirit of gambling and speculation which its excessive quantity fomented. The reaction of 1873 was inevitable, and the period of apparent depression which followed it was in reality a period of recovery from unhealthy and abnormal conditions. But the attempt was again made to cure the evil by the panacea of more money, and for a time the prevalent distress gave that remedy a vogue. The climax of the movement was reached in 1874, when Congress passed a bill for increasing

the volume of legal tenders to $400,000,000. That bill was courageously vetoed by President Grant, in a message which marks the beginning of the decline in the paper-money craze. President Grant's veto made a profound impression on the country; the bill could not pass over it. In its place Congress passed an act which, while it provided for some enlargement of the currency, was an admission of the defeat of the inflationists.

The last stage in this part of our currency legislation was reached by the Resumption Act of 1875. That act was passed as a strict party measure by the Republicans, after their defeat in the elections of 1874. It provided for the resumption of specie payments on the 1st of January, 1879, and for a decline in the volume of the legal-tender notes. The contemplated decline in the volume of the legal-tender notes was put an end to by later legislation, in 1878, when the quantity of greenbacks, or United States notes, was fixed at the amount which then happened to be outstanding—$346,681,016. They have remained outstanding in that fixed amount to the present time. But the resumption of specie payments provided for in the act of 1875 was successfully accomplished. The Treasury, in the years from 1875 to 1879, accumulated a reserve of about $130,000,000 of gold, with which to redeem the notes. In fact, when the day of resumption arrived hardly any notes were presented, and the transition from an irredeemable paper currency to one based on specie was accomplished without a jar. In the same period, from 1875 to 1879, the country gradually recovered, by a natural process, from the depression which had ensued after the speculative collapse of 1873. The inflationist movement almost disappeared; prosperity accompanied the resumption of specie payments; and the circulating medium of the country seemed to have reached a sound and permanent basis.

But hardly had this stage been reached when a new problem arose. The question whether the paper money of the community should be redeemed in specie had indeed been settled by the act of 1875 and the successful resumption of 1879; but the question at once arose, in what *kind* of specie the paper should be redeemed. To understand the bearing of that question it will be necessary for us to consider, first, the unexpected changes in the development of the national banking system; and, next, the course of legislation as to silver.

First as to the national banking system. We have seen that immediately after the close of the civil war, the national bank

notes had been expected to form the paper currency and the every-day circulating medium of the country. They were to be redeemable in specie, and to supply a currency at once sound and ready to expand easily in response to the growing needs of the country. The retention of the legal-tender notes had given them an unexpected position. The bank notes were redeemable in legal tenders, and therefore fluctuated in value in precisely the same way as the legal tenders did. Their volume had at first been limited to the fixed amount of $300,000,000; but when the Resumption Act was passed, the limit of their issue was removed, and the national banks were allowed to issue their notes without any limitation of the total volume, always on the security of bonds of the United States for the unfailing payment of the notes. After 1878, when the legal tenders were set at a fixed amount, it was to be expected that the growth of currency would take place by the increased issue of national bank notes.

In fact, however, the volume of the national bank notes not only ceased to grow, but greatly declined. The increase of our currency after 1879 took place mainly in another direction, by the issue of money upon a silver basis. For a year or two after the resumption of specie payments, it is true, the volume of national bank notes outstanding increased somewhat. The maximum was reached in 1882, when the total volume of national bank notes was nearly $360,000,000. After that date a steady decline set in, which was especially rapid in the years from 1886 to 1891. In the latter part of 1892 the total volume of the national bank notes outstanding was only $172,000,000: in the course of ten years the reduction was nearly $200,000,000. Consequently these notes, instead of forming the most important part of the circulating medium, as they had been expected to do, played a comparatively insignificant part. The cause of this decline can be stated very briefly. The terms under which national bank notes could be issued were too hard. The banks were required to deposit United States bonds to the amount of $100 in order to be permitted to issue $90 of bank notes. In addition, they were subjected to an annual tax of one per cent on the notes; they had to keep a redemption fund with the Treasury at Washington; they were subject to some other expenses. Their chief cause of embarrassment was the difficulty in securing United States bonds. As the credit of the United States improved, bonds went to a premium, and for a number of years were held at prices so high as to leave practically no margin of profit for the bank which bought them to

issue notes against them. Consequently the tendency has been to diminish the issue of bank notes, and the decline of the bank-note circulation has been the inevitable result. That decline is to be regretted, for the issue of bank notes under such conditions of safety as the national banking system affords is the safest and readiest, at once the most sound and the most elastic method of providing a community with the currency which it needs. But of this we shall have more to say presently.

We turn now to the second change which affected our currency after the resumption of specie payments—the growing volume of silver money.

When the country began to coin gold and silver, in 1792, it attempted to establish bimetallism. Gold and silver were both to be freely coined at the mint at a ratio of 15 to 1. The attempt was a failure. Silver at that time was worth in the market less than it was worth at the coinage ratio established at the United States Mint, and it proved impossible to keep gold in circulation. Accordingly, in 1834, when there was a strong movement to secure a specie currency in place of the bank notes then in use, a change was made, reducing the amount of gold in the gold coins, and making the ratio between gold and silver 16 to 1 instead of 15 to 1. This change had the expected effect of bringing gold into the United States. The ratio then established was maintained uninterruptedly from 1834 throughout the time when the double standard nominally existed, and it is the ratio under which silver dollars of our own time have been struck. The effect of the change made in 1834 was virtually to introduce into the country the single gold standard. Silver was no longer brought to the Mint; indeed, silver had been coined only in very small quantities even in the early period from 1792 to 1834. In 1873 the gold standard, which had in fact prevailed in the country for many years, was legally established as the only coin standard. It must be remembered that in 1873 the money of the country was depreciated paper, and that in fact gold was not in circulation. The legislation of 1873 was in the nature of a general revision of the coinage laws, in anticipation of that resumption of specie payments which was successfully accomplished six years later. As the silver dollar, although it had been nominally a standard coin throughout the period from 1792, had been little coined, and had never been seen after 1834, it was dropped from the list of coins of the United States, and the coinage system was so put upon a gold basis. The change attracted at the time no attention, was challenged by

nobody, and was a simple recognition by law of a state of things that had in fact existed for nearly half a century.

Such was the situation when, about 1875, a great change took place in the relative position of gold and silver in the markets of the world—a change which exercised a dominant effect on the development of our currency from 1878 to 1893. About 1873 the price of silver began to fall. A great fall took place in 1876, and the price continued to go down more or less steadily thereafter. In 1873, when the silver dollar was dropped from the list of our coins, it was worth intrinsically a trifle more than the gold dollar. In 1876 the silver dollar was worth ninety cents in gold; by 1883 it went down to eighty-five cents, by 1889 to seventy-five cents; in 1892 it was worth only sixty-six cents. This extraordinary change was undoubtedly due chiefly to the marked increase in the production of silver. In 1873 the total production of silver in the world was 63,000,000 ounces; in 1876 it rose to 68,000,000, in 1886 to 93,000,000, in 1891 to 144,000,000. The increase was continuous, and throughout these years showed no sign of slackening. With the depreciation of silver, the silver dollar became cheaper than the gold dollar, and those who wished for cheaper and more plentiful currency turned to silver as virtually equivalent to a depreciated greenback. The inflationist party, beaten in their attempt to secure an increase in the quantity of paper money, endeavored to substitute silver for gold. In 1878, when the depression which followed the crisis of 1873 was still felt, they secured a degree of success. The Bland Act of that year provided for the coinage of a limited number of silver dollars—not less than two million dollars' worth a month, and not more than four million dollars' worth a month. It was left to the discretion of the Secretary of the Treasury whether to keep to the upper or the lower limit; but every Secretary of the Treasury, in fact, kept to the lower limit. Virtually, therefore, the act resulted in the yearly coinage of about thirty millions of silver dollars, and an addition of so much to the currency of the community. At the time of its passage, in 1878, much had been said about the fraudulent and dishonest treatment of the silver dollar in 1873, when its coinage had been suspended, and about the restitution of the dollar of the fathers by the act of 1878. In fact, however, the silver dollar had never been the dollar of the fathers, and the cessation of its coinage in 1873 had been a purely formal act, which neither had, nor was intended to have, any consequence whatever at the

time. The demand for the coinage of silver in 1878 was simply another form of the inflationist cry for more money.

The act of 1878, providing for this yearly addition of thirty million dollars of silver money, remained in force for twelve years, until 1890. It served to alter materially the composition of the circulating medium; but it did not affect its character as much as had been expected. To understand the working of the measure, we must consider the relation which the circulating medium of the United States bears to the needs of the community. The United States is growing rapidly in population and wealth—growing at a pace unexampled elsewhere in the world. In the period during which the act of 1878 was in force we added to our population in round numbers a million a year; and the transactions and wealth of the community increased probably at more than a corresponding rate. Such a community needs a steady increase in its circulating medium. To repeat what has already been said, the original expectation was that the national banking system would meet the growing demand. In fact, the volume of national bank notes declined, and the steady issue of silver money under the act of 1878 served to fill the void made by the decline of the national bank note circulation, and so provided for the steady increase called for by the growth of the country. Unexpectedly, the act of 1878 worked no harm, and brought about no change in the standard of value. The effect was the same as if the national banks had issued notes in that amount, or if the Government had issued legal tenders in the same quantity. Owing to the steady increase in the wealth of the community, the growing issues were absorbed without leading to a depreciation of the whole mass of the circulating medium, which continued to rest on a gold basis.

The silver money of the act of 1878 was issued chiefly in the form of silver certificates, and this paper money became a very large part of the money passing from hand to hand in the community. The silver certificates represent silver dollars actually coined, and actually lying in the vaults of the United States Treasury. They are convenient to handle, and are issued in the denominations called for by the public; it is consequently in that form, rather than in the form of the actual coined dollar, that the silver currency plays its part. Of the total mass of about 370,000,000 silver dollars coined under the act of 1887, only about 60,000,000 went into actual circulation. The rest lay in the Treasury vaults, and were represented by silver certificates.

Such was the situation when, in July of 1890, an act was passed marking still another phase in the history of the currency. That act, like the earlier one of 1878, was the result of a compromise. On the one hand, there was a party eager for the free coinage of silver—that is, for the virtual depreciation of the currency by one third. On the other hand, there was a party which desired to maintain all the money of the country at par with gold. The compromise consisted in providing for a large regular increase of the circulating medium, but with provisions designed to secure convertibility into gold. The Secretary of the Treasury was required to buy each month four and a half million ounces of silver at the market price, and to issue therefor "Treasury notes" to the amount of the market price of the silver. These notes were to be legal tender, and were to be redeemable in gold or in silver coin, at the option of the Government. The Treasury undoubtedly would try to redeem them in gold so long as possible, and redemption in silver was considered an undesirable and remote contingency. The new Treasury notes were made legal tender in payment of all debts—a quality which the silver certificates never had. In all respects the new notes were precisely like the old legal-tender notes or greenbacks of the war issue, the amount of which had been fixed in the manner described a few pages back. The act of 1890 provided for a large monthly addition to the legal-tender issues; in so far it was a victory for the inflationist party.

The amount of this monthly issue depended upon the market price of silver. The act called for the monthly purchase of four and a half million ounces. If silver sold at a dollar an ounce, this meant the issue of $4,500,000 of legal-tender notes. If silver sold at eighty cents an ounce, it meant a monthly issue of $3,600,000. When the act was passed, it was expected that the effect would be to raise the price of silver. Indeed, it was hoped that the price of silver would be so much raised by the Government purchases that the silver dollar would become worth intrinsically as much as the gold dollar. This expectation was grievously disappointed. For a month or two after the passage of the act the price of silver did indeed rise, and at one time, in August, 1890, was as high as $1.20 an ounce. At that price the silver dollar is worth intrinsically about ninety-three cents in gold. But soon silver began to fall—fell to $1.10, to $1.00, kept on falling through 1891 and 1892, until, by the close of 1892, the price was eighty-five cents an ounce, with a tendency to fall still lower. At eighty-

five cents an ounce, the silver dollar was worth intrinsically but sixty-seven cents in gold.

Such was the situation when an almost dramatic series of events led to the repeal of the act of 1890, and the close of the silver episode in our financial history. The steadily growing issues of Treasury notes, and the steady decline which the price of silver showed, notwithstanding the heavy purchases of the United States, had begun to cause much uneasiness in the latter part of 1892, and still more uneasiness in the beginning of 1893. There were heavy exports of gold in the early part of the latter year, largely the result of the silver legislation; and this had caused financial uneasiness, and an ominous decline in the Treasury gold reserve. Under these conditions a sudden blow came to cap these causes of disturbance, and completely dishearten the advocates of silver: the cessation of the free coinage of silver by the Indian Mint. British India, where the free coinage of silver had till then been maintained, and the United States, with its heavy purchases under the acts of 1878 and 1890, had absorbed the greater part of the world's product of silver. The cessation of free coinage in British India threatened to take away half of the market for silver, and the price dropped at once. It sank to 80 cents, 75 cents, 70 cents, even to less; and the silver dollar so came to be worth, intrinsically, hardly more than half of its face value. This abrupt change, coming at a time when uneasiness was already great, precipitated one of the severest financial panics through which the country has passed. The decline in the Treasury gold reserve, the collapse of the silver market, and the fear that the currency of the country would rest on a depreciated and depreciating silver basis, caused a complete breakdown in confidence. Banks failed in all parts of the country; mercantile firms followed; money was hoarded; all the phenomena of a commercial crisis in its most acute form appeared.

Under these conditions, President Cleveland called an extra session of Congress, which met in midsummer of 1893, and proceeded at once to the consideration of the silver legislation. The panic was due, directly or indirectly, to that legislation. The danger of a breakdown of gold payments undoubtedly existed; and, whether or not that danger was imminent, the fear of the breakdown was the cause of the panic. Congress accordingly repealed the Silver Purchase Act of 1890, after a brief and pregnant debate in the House, and a long and weary struggle in the Senate. The repeal was finally enacted at the close of October,

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too late to mitigate effectually the panic of the summer, but in time to prevent a recurrence of another acute crisis.

The repeal of the act of 1890 marked the end of the silver experiments, and a defeat, probably final, for the advocates of cheap money. Both the acts of 1878 and 1890 were compromises between the advocates of inflation, and those of sober and conservative legislation. These compromises in their nature could not endure, especially as the silver men, not content with the great concessions made to them in the act of 1890, continued to demand insistently the free coinage of silver. The outcome of the struggle was their final and complete defeat. Therewith the monetary history of the country entered upon a new stage. The issue of silver currency ceased, and a different basis for the growth of the circulating medium of the country became inevitable.

It remains now to say a few words as to the causes and the character of the movement for an enlarged currency, and to consider what is the sound policy to be followed by the community. The inflationist movements, whether in the form of a demand for *fiat* money, or free coinage of silver, or unregulated issue of bank notes, have always had their stronghold in the West. They have been due chiefly to ignorance of the causes of industrial depression, and to a desire, not unnatural, to find a remedy for distress in some sort of legislation. It is during periods of depression, like those from 1873 to 1878, and from 1887 to 1890, that the panacea of more money is called for. The real cause of the bad times, however, is not deficiency of money; and no mere increase of the money supply will bring a remedy. The alternations of prosperous activity with halting depression in trade and industry, which recur at almost regular intervals in modern times, seem to be the inevitable results of the complications of exchange and the sensitiveness of credit. They come, whether money be plentiful or scarce, in old countries and in new countries; and, so far as monetary problems are involved at all, the best safeguard and palliative for them is stability and steadiness in the circulating medium. The chief cause of agricultural depression is the superabundant production of agricultural commodities, and especially of the cereals, and their consequent low price. In the westward march of population and industry, to which attention is called in the earlier pages of this chapter, there have been successive stages of going West *too fast*—stages when the farms of the West have been taken up with exceptional rapidity, when railroads have been extended into new districts with feverish activity, and when the

quantity of grain and other farm products on the markets has inevitably lowered prices. In recent years this cause has been re-enforced by the competition of foreign countries, more particularly of India, and at times of Russia. These have depressed the price of grain ; and the accidents of the season have also affected the crops of the farmers. In the periods of depression, due to these factors and to others, the cry for more money has arisen, to disappear when better crops and enlarged demand have brought seasons of fresh prosperity. After the resumption of specie payments in 1879, when the West prospered, the inflationist movement almost disappeared from sight. It revived in the next period of depression, which arrived about the middle of the decade 1880–'90. It relaxed again as the year 1891 brought heavy crops and good prices. All these variations of prosperity and depression have been independent of changes in the currency, and it is certain that inflation of the currency will not prevent them from recurring.

That the call for more money should appear in the newer States of the West and South is due in some degree also to another cause. These are communities rich in natural resources and poor in the apparatus of production. They want and can profitably use an abundant supply of fresh capital. In every-day language, capital and money are confounded. We speak of capital in terms of money, and think of moneyed men as capitalists. The concrete form in which the individual merchant or farmer in the new States wants advances is the command of so much money. It is not unnatural that he should believe that, if there were only more money in the community, it would be easier for him to secure command of more capital. He forgets that money is nothing but the medium of exchange, needful for enabling the exchanges to be conveniently conducted, but not contributing an iota to the efficiency of production, or to the prosperity of industry. What the merchant wants is goods to dispose of; what the farmer wants is machinery, seeds, buildings, labor to till the ground. These things he purchases with the money which comes into his possession; abundance of these alone contributes to material prosperity. He does not perceive that if money is more plentiful commodities will simply become higher in price, and that a greater quantity of money will merely cause them to be assessed at higher rates, and will not bring the command of a larger quantity of them.

In the currency legislation of a country growing as rapidly as

the United States it is undoubtedly essential that some provision should be made for a steady increase of its circulating medium. It has sometimes been said that that increase will take care of itself, and that, in the absence of legislation, the supply of gold will appear automatically, so to speak, and will give the community the circulating medium that it needs; or that, if the gold fails to appear, a simple fall in prices will ensue, things will be exchanged for each other on somewhat different terms, and nobody will be the worse off. But this optimistic view of the situation is hardly justified. The world's supply of gold, while not so inadequate as we are sometimes given to understand, certainly is not sufficient to supply the needs of every community, or even of the United States alone; while a general and marked fall in prices would be by no means a matter of indifference. Provision should therefore be made, and must be made, by legislation for enabling the volume of the currency to increase by credit issues of some form.

But, in making these credit issues, all experience teaches that the only way to prevent them from having disastrous effects is to base them upon specie, and to make them convertible into specie. Our history during the civil war, and the history of almost every country that has resorted to irredeemable paper money, shows that such a resort is a stimulus to speculation, and to feverish activity; it brings an era of apparent and fictitious prosperity, followed by an eventual collapse, and by the proved necessity of a return to specie payments as the only safe means of insuring an equable currency and an even development in prices. The most important quality which a medium of exchange should possess is stability, and the thing which the community should strive for is a steady movement of prices; and that can be secured only by a specie basis. Every community which has tried the experiment of inflation has eventually found its evils intolerable, and, at whatever cost, has resumed specie payments.

Specie, however, in our time must mean gold—at least so long as the present relations of gold and silver continue. The enormous production of silver during the last twenty years has caused its price to fall, so that it has become little less unstable and fluctuating in value than irredeemable paper currency itself. A currency based upon silver would indeed be less bad than an unlimited issue of paper money. It would have some bottom, so to speak. Silver, however declining in price and fluctuating in price, is certainly a better basis for the circulating medium than

corn or pork or copper; but in the degree to which its value is depreciating it is as bad a basis for the circulating medium as irredeemable paper. If, indeed, it were possible to secure an international agreement for the concurrent use of silver and gold, the fall in the price of silver might be arrested, and silver might resume its place side by side with gold as the basis of the circulating medium. So far all attempts to bring about such an international agreement have proved unsuccessful. It may be fairly said, too, that the currency legislation of the United States, tending as it did to keep up the price of silver to a certain extent, was an obstacle to such an agreement by preventing other countries from feeling the full effects of the depreciation of that metal. At all events, so long as silver remains in its present position, it affords no adequate basis for the money of a great civilized community.

Specie, therefore, means gold. The United States should so regulate its currency as at once to provide for a healthful increase in its volume and to keep the whole mass easily convertible into gold. The most obvious error in the act of 1890 was that the issues were too large, and made the maintenance of gold payments difficult, if not impossible. But there was another difficulty. The act provided for the regular issue of notes directly by the Government. Such a method always tempts to excess. Every government which issues paper money directly, is confronted with the common confusion between money and capital, with the feeling that abundance of money, being a good thing for the individual, must be a good thing for the community, and with the disposition, especially in new countries, to resort to currency issues as a cure for real or fancied distress. Consequently, any measure which provides for direct issues by the Government is fraught with danger. The better plan for procuring a normal and healthy growth of the circulating medium is to permit and to encourage the issue of safe and sound bank notes. We have seen that at the close of the civil war the national banking system was looked to for providing the every-day currency of the community. It is unfortunate that that system has been allowed gradually to play a less and less part in supplying the every-day circulating medium; and the better policy for the future would be to encourage the issue of circulating notes by national banks, or by State banks issuing notes under similar conditions. A State banking system adequately guarded, providing abundantly for the certain redemption and payment of notes issued, would meet the want as well as the

national banking system. In order to be adequately guarded, it must be under central control, and with uniform rules for the security of the notes. Such uniformity and security can be attained only by Federal supervision and administration. In other words, a system of State bank notes, in order to be adequate and sound, must be modeled more or less upon the national banking system.

Whether in the form of United States notes, Treasury notes, silver certificates, national bank notes, or of State bank notes—whatever be the way in which the growth of the circulating medium is provided for—it can be safely undertaken only by resting it solidly upon gold. No other method is adequate to secure a firm and stable currency, one which will enable the exchanges of products to be carried on steadily and equably, which will assist production without disturbing it, and which will enable the labor and capital of the community to exert themselves with that steadiness and order which are necessary to the development of sound prosperity.

CHAPTER XIII.

PUBLIC HYGIENE IN THE UNITED STATES.

THE popular estimate of the value of public sanitary measures in the United States has undergone a marked change within the past twenty years. A good illustration of the truth of this statement may be found in the following quotation from one of the foremost sanitarians in this country, published, in 1879, in the introduction to Dr. Buck's treatise on Hygiene and Public Health, vol. i:

"It may seem strange that public health should not receive more attention and consideration from politicians and legislative bodies than we actually find to be the case. A standing committee on public health would be about the last committee that either Congress or a State Legislature would think of organizing."

At the present day such committees form a part of the preliminary organizations of State Legislatures in the older States, and are also supplemented by other committees organized for the consideration of kindred questions, such as those of water supply and sewerage.

The reasons for this change of sentiment undoubtedly exist in the increasing density of the population, the demands of the people for pure air, food, and water, and freedom from the dangers of infectious diseases, and the free discussion of public sanitary measures by the daily press.

The foundation of progress in public hygiene in America may be said to have been laid when the early colonists enacted the following as one of the first statutes:

"Item: That there be records kept . . . of the days of every marriage, birth, and death of every person within this jurisdiction." (Colony Laws, Massachusetts, chapter iii, 1639.)

The importance of such statutes in securing the correct data relating to vital statistics is everywhere acknowledged as a cardinal principle of public hygiene. Dr. Billings, in a paper communicated to the American Public Health Association, recognizes this principle in the following language:

"My observation of the progress of public-health work in this and other countries, for the past twenty years, leads me to believe that this progress, in any locality, for any considerable length of time, depends upon the completeness of its vital statistics and the use that is made of them."

During the following century—the eighteenth—thirty-five different acts were passed by the Massachusetts colony relating to sanitary matters, the principal topics embraced in them being the regulation of offensive trades, the prevention of dangerous infectious diseases, the regulation of drains and sewers, suppression of nuisances, provision for hospitals, and, finally, for the establishment of local boards of health in certain towns.

The establishment of sanitary organizations, local and general, has often followed a serious epidemic of infectious disease. The Boards of Health of the towns of Boston and Salem were organized, in 1799, as a result of the serious epidemic of smallpox in 1798. The Massachusetts Sanitary Commission of 1850, the forerunner of the first State Board of Health, was undoubtedly a result of the cholera epidemic of 1849. The establishment of the National Board of Health of 1879 followed immediately after the serious yellow-fever invasion of 1878; and the State Board of Health of Florida was organized as a result of an outbreak of the same disease in that State in 1888.

In 1850 a commission was appointed by the Governor of Massachusetts to prepare a sanitary summary of the State. The report of that commission is one of the most thorough, comprehensive, and progressive documents of that period. One of the foremost recommendations of the commission was the following:

"We recommend that a General Board of Health be established, which shall be charged with the general execution of the laws of the State relating to the enumeration, the vital statistics, and the public health of the inhabitants."

It was nearly twenty years (1869) before the suggestions of this commission were finally carried out and a State Board of Health was established, very nearly upon the basis which had been recommended. This movement was followed in other States, the following being the date of establishment of the State Boards of Health:

Louisiana	1867	Minnesota	March, 1872
Massachusetts	June, 1869	Michigan	1873
California	March, 1870	Maryland	April, 1874
Virginia	February, 1872	Alabama	January, 1875

Georgia	June, 1875
Colorado	February, 1876
Wisconsin	March, 1876
Mississippi	February, 1877
New Jersey	March, 1877
Tennessee	March, 1877
Illinois	May, 1877
Connecticut	January, 1878
Kentucky	March, 1878
Rhode Island	April, 1878
South Carolina	December, 1878
Delaware	1879
North Carolina	1879
Iowa	March, 1880
New York	May, 1880
Arkansas	March, 1881
Indiana	March, 1881
West Virginia	March, 1881
New Hampshire	August, 1881
Missouri	March, 1883
Maine	February, 1885
Kansas	March, 1885
Pennsylvania	June, 1885
Ohio	April, 1886
Vermont	November, 1886
Florida	February, 1889
Nebraska	March, 1891
Washington	1891
Oklahoma Territory	1891

Another general movement which has proved an efficient stimulus to public hygiene on this side of the Atlantic was the organization of the American Public Health Association in 1872. This organization is composed of members of State and municipal boards of health, physicians, engineers, chemists, and all others who are interested in public hygiene. It has held annual meetings in the principal cities of the United States for twenty years, at which all the different branches of public hygiene have been made the subject of discussion, and has proved very helpful not only to the localities in which the meetings have been held, but also to all its membership. Its volumes of transactions constitute a storehouse of information upon the many topics which have annually been presented. In the later years of its existence it has extended its membership to the Dominion of Canada, and still later to Mexico. Its last meeting (1893) was held in Chicago.

The term *public hygiene* embraces very nearly the same scope as *preventive medicine*, and properly includes all the subjects which pertain to the prevention of disease and the prolongation of human life.

Dr. De Chaumont, Professor of Military Hygiene at the British Army Medical School, defines hygiene as "the art of preserving health—that is, of obtaining the most perfect action of body and mind during as long a period as is consistent with the laws of life. In other words, it aims at rendering growth more perfect, decay less rapid, life more vigorous, death more remote."

Certain essentials are requisite for the preservation of the health of any community, as well as of the individual. Chief among these may be reckoned purity of the air which we breathe, purity of the domestic water supply, purity of the food supply, and, finally, of the soil upon and over which we live. To secure

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Turn-Verein Festival.—Preliminary exercises.

(Photographed by the Milwaukee Art Gravure and Etching Company.)

these conditions constitutes a part of the duty not only of the individual but also of public sanitary authorities having in charge the execution of health measures, either local or general in character.

Public Water Supplies.

The growth of *public water supplies* in the United States may be taken as an index of progress in the public estimate of the value of sanitation. In 1800 there were but 16 public water supplies in the country, most of which had been established between 1790 and 1800, and all these combined supplied a population of less than 150,000. Fifty years later there were only 83 public water supplies in the Union, while in 1890 there were 1,878 such supplies, furnishing water to a population of 22,470,600; and on July 1, 1891, the number of such supplies had still further increased to 2,037. The growth of water supplies has been therefore mainly in the past forty years, and also largely in the past ten years. The population supplied in 1880 was 11,809,000, as compared with nearly 22,500,000 in 1890.

The following figures represent the growth of public water supplies in the United States during the past century:

Growth of Water Works in the United States.

(Compiled from the Manual of American Water Works, editions of 1888 and 1891.)

	Years.	No. of water supplies introduced.	Years.	No. of water supplies introduced.
	Before 1801	16	1866	7
5-year periods.	1801–1805	7	1867	10
	1806–'10	3	1868	14
	1811–'15	..	1869	20
	1816–'20	4	1870	28
	1821–'25	2	1871	34
	1826–'30	12	1872	32
	1831–'35	10	1873	47
	1836–'40	10	1874	37
	1841–'45	6	1875	41
	1846–'50	13	1876	47
	1851	4	1877	15
	1852	5	1878	31
	1853	4	1879	43
	1854	6	1880	39
	1855	6	1881	40
	1856	6	1882	79
	1857	8	1883	87
	1858	5	1884	106
	1859	8	1885	94
	1860	9	1886	133
	1861	4	1887	181
	1862	7	1888	198
	1863	..	1889	200
	1864	4	1890	153
	1865	8	1891	145 (to July 1st)

Systems of Sewerage and Sewage-Disposal.

While great activity has everywhere been manifested in the introduction of water supplies, it is also true that in many instances too little care has been taken with reference to the quality of the water. The necessity of purity as a requisite for the public water supply of any community is a public-health axiom. And yet several cities continue to distribute drinking water to their inhabitants drawn from the same lakes into which a considerable portion of their sewage is allowed to flow without treatment. Other cities also draw their water from rivers into which the sewage of large and increasing populations is directly discharged at points above the source from which the water is taken.

This direct pollution of the water supply makes itself manifest in most of these cities by an increased death-rate from typhoid fever, which is the direct result of disregard of this maxim of public health.

The following figures show the comparative death-rates from typhoid fever per ten thousand inhabitants in cities having good water supplies, or such as have been purified by filtration, and in other cities having polluted water supplies.

Cities having comparatively pure supplies:

	Death-rates from typhoid fever per 10,000 population.
New York, 1880–'89	3.36
Berlin, 1878–'88	3.1
Dresden, 1878–'88	1.7
Leipsic, 1878–'88	2.1
Boston, 1881–'90	3.5

Cities having polluted water supplies:

Philadelphia (ten years), 1880–'89	6.80
Chicago (ten years), 1880–'89	6.25
Chicago,* 1891	16.64
Lowell (twenty years)	8.45
Lawrence * (twenty years)	9.23

Provision should be made in every community furnished with a public water supply for the removal of the sewage by a properly devised system of public sewers. The subjects of water supply and sewerage are correlated and can not well be separated, since the water running from each tap, tub, fixture, shop, and factory

* In both of these cities (Chicago and Lawrence) the typhoid-fever mortality has been materially reduced during the past year (1893) by efficient measures taken to secure purer water.

is then and there directly converted into the sewage of the community. The sewage is the waste and filth of each household plus the added water. It is desirable that this sewage should be taken away from each household and from the whole community as rapidly as possible, and it should be disposed of in such manner as will cause the least annoyance and danger to the public health, not only of the community which produces it, but also of other neighboring communities.

The methods of such disposal are various, and the best mode to be selected must be determined by the location and other conditions of each community. No hard-and-fast rule can be laid down for the government of all places in this respect.

The method of sewage disposal by irrigation is adopted at Paris, Berlin, and other foreign cities with success. At Berlin about 18,000 acres of sterile soil receive the sewage of the city, and render it fertile for the production of large and successive crops of forage, garden vegetables, and fruit.

The method of disposal by downward intermittent filtration upon suitable soil requires a smaller area than the former, and if properly managed yields a clear, purified effluent.

Disposal by chemical treatment frees the sewage from its suspended matter, and, when supplemented with subsidence in tanks of ample construction, affords an effluent which is comparatively clear, but the purification is much less complete than that which is obtained by sand or gravel filtration.

Disposal into the sea offers an efficient and satisfactory mode for such cities as are situated near the mouths of large rivers, where the sewage may be carried far out to sea by the outgoing tide. The sewage of Boston, which is discharged at Moon Island on the outgoing tide, is so thoroughly dissipated in the immense volume of sea-water that its presence can not be determined by chemical analysis two hours after the discharge.

The chief defect in the United States, so far as matters of this sort are concerned, lies in the fact that, while more than two thousand municipalities have up to this time introduced public water supplies, on the other hand less than one tenth of that number have provided means for sewage disposal of any sort, and in many instances the systems which have been introduced are defective and unsatisfactory.

Recent legislation is beginning to have a perceptible influence in improving systems of water supply and sewerage, and diminishing the liability to danger from defective methods.

The law enacted in the State of Massachusetts, entitled An Act to protect the Purity of Inland Waters, has proved a very broad and satisfactory statute, and after a test of seven years may be cited as a model law. It provides for supervision of the inland waters of the State by the State Board of Health; authorizes them to employ engineers and other experts; to examine the waters of the State with reference to their use as water supplies; to recommend measures for preventing pollution; to conduct experiments upon the purification of sewage; to consult with towns, corporations, and individuals with reference to the subjects of water supply and sewage disposal. All cities, towns, and corporations are required to submit their plans, relating to such matters, to the board for its advice, before petitioning the Legislature for authority to introduce such systems of water supply and sewerage.

Under the provisions of this act the State Board of Health of Massachusetts organized an engineering department, established a station for the purpose of experimenting upon the filtration of water and the treatment of sewage, and employs a corps of trained engineers, chemists, and biologists, the results of whose work are now too well known on both sides of the Atlantic to need further mention.

That provision of the act which requires the authorities of cities, towns, and corporations to apply to the board for advice in regard to proposed plans of water supply and sewage disposal has proved useful to such communities in two hundred and seventy-nine instances up to the date of the present writing (January, 1894).

The Inspection of Food.

Since an ample supply of sound and wholesome food is essential to the well-being of any community, either large or small, it is an appropriate function of the sanitary authority of such community to exercise a watchful care over its food supply.

It has been found convenient in most European countries to give to local authorities in the cities and large towns power to examine the food supply, and to impose fines or penalties for transgression of the laws, while the central Government exercises control in a general way. The Local Government Board exercises such control in England, while analysts and inspectors can be appointed in urban districts. In most Continental cities the public analyst has authority to examine not only food products but many other articles, the examination of which requires the serv-

ices of a chemist, such as textile fabrics, wall-papers, fertilizers, water, wines, liquors, and drugs. More than 200,000 such analyses were conducted in the cities of Germany in a single year, and the examinations made at the municipal laboratory of Paris, under the direction of Prof. Girard, amount to 15,000 or more in each year.

Attempts have been made to enact a general adulteration act for the United States, but thus far they have failed. Several States have succeeded in enacting very good laws of this nature, notably New York, New Jersey, Massachusetts, and Ohio. In some of these States the execution of the law has been placed under the supervision of the State Board of Health, and in others under a special commissioner. In Massachusetts the law has been in operation for ten years, under the authority of the State Board of Health. Nearly 50,000 samples of food and drugs have been examined in that time, and about 900 prosecutions conducted against offenders. The result of all these examinations has shown that by far the greater number of food adulterations are harmless frauds, the object of which is to sell an article of inferior quality at the price of one of good quality.

The principal articles of food liable to such adulteration in the United States are milk, butter, coffee, spices, sirups, honey, cream of tartar, vinegar, and olive oil.

The principal staple articles of food—flour, sugar, and the cereals—are very rarely adulterated in this country.

School Hygiene.

School hygiene embraces all sanitary questions which pertain to the school life of the young.

The term as usually employed, refers largely to the physical environment of the pupil during the hours of study—the location of the schoolhouse, its relation to the neighborhood, its drainage, water supply, materials of construction, location of sanitary fixtures, heating, lighting, and ventilation, protection from fire, arrangement and adaptation of seats and desks to the needs of the pupil, coloring of walls, sizes of types for text-books, etc. Another important question is that of protection from the spread of infectious diseases through the schools, especially among the lower grades. Length of hours of study, recesses, and vacations also properly constitute an appropriate part of the same subject.

Commendable progress has been made in most of these points within the past twenty years, especially in the schools of the larger American cities. There is, however, abundant room for improve-

ment in accurate methods of investigation, such, for example, as are shown in the admirable report of Prof. Rietschel upon the ventilation of the school buildings of Berlin, as determined by many careful examinations of the quantity and quality of the air supply; or such work as that of Dr. Janssens, of Brussels, who goes so far as to supplement sanitary inspection of the public schools by therapeutic treatment in the case of those pupils whose physical development is not up to the average standard.

The Management and Control of Infectious Diseases.

One of the principal functions of any local sanitary authority is the work of limiting, so far as lies within its power, the spread of those infectious diseases which are acknowledged to be preventable—in other words, the principal communicable or transmissible diseases of mankind. The time is fast passing away in which the principal infectious diseases can be regarded as having a *de novo* or spontaneous origin. The term "filth disease," so commonly used a score of years ago, as though filth originated disease, is now more intelligently employed to convey the meaning that filth is not the source or origin of infectious disease, but the favorable soil in which the germs of such disease may be propagated. Hence the intelligent removal of filth affords one method of prevention. While human power may not be sufficient to eradicate all infectious diseases, the experience of the past half century goes to show that a great deal has been and can be accomplished by way of limiting their spread, and consequently of reducing the death rate from this cause. Witness, for example, the experience of the German Empire in restricting—in fact in almost entirely suppressing—smallpox within the limits of the empire, by the thorough enforcement of statutes requiring vaccination of all children under two years of age, and revaccination of all at the age of twelve.

In Germany, for the four years 1886–'89, with a population of over 47,000,000, the average annual death rate from smallpox was only 3.5 per million of the population, while in the neighboring countries of Belgium, Italy, Austria, Russia, and Spain, for the same period, the death rate from the same cause was respectively 164, 536, 471, 231, and 963 per million of the population. (Report of the Imperial Board of Health of Germany for 1890, Dr. Rahts.)

Thorough filtration of the public water supplies of large cities through carefully prepared beds of sand has reduced the mortality rate from typhoid fever in London and Berlin to less than three

per 10,000 of the population annually; while in cities like Chicago, Philadelphia, Lawrence, and Lowell, where unfiltered water polluted with sewage is used, the death-rate from this cause has risen in the past few years to twice and thrice that of Berlin and London.

In the control of the infectious diseases of childhood, such as scarlet fever, measles, and diphtheria, very much has been accomplished by sanitary authorities acting under the provisions of laws regulating school attendance from infected families, and providing for the isolation of infected households.

In Massachusetts, for example, the death-rate from scarlet fever has fallen from an annual ratio of 8.2 per 10,000 of the population in the ten years 1861–'70 to 2.1 per 10,000 annually in the ten years 1881–'90. The same has been observed in other States having registration as well as efficient sanitary statutes. It would be too much to claim that all this reduction in mortality is due to the operation of such laws; but that a very large share of it is due to their wise execution, as well as to an enlightened popular knowledge of the causes of the spread of disease, there can be no reasonable doubt.

To all these measures disinfection adds a potent weapon toward the suppression of infectious disease, where it is intelligently conducted under the control of a sanitary authority. Much has been accomplished by the careful inquiries of Koch, of Klein, and of Sternberg as to the value of different substances for the purpose of disinfection, and the methods of their application. Public disinfecting stations, at which infected household material can be treated, now constitute a part of the equipment of the health authorities of the chief cities of Europe, and are greatly needed as auxiliaries to boards of health in the United States.

Another important need in all our large cities is the establishment of isolating hospitals for infectious diseases, to which persons—and especially the young—affected with such diseases can be taken from the crowded tenements and densely settled districts of our larger cities and towns for such treatment as may be necessary, so that the wage earners in such households may pursue their daily toil without the constant danger of transmitting infection to others.

The Disposal of Garbage, Offal, and Street Sweepings.

The disposal of such material has proved a serious annoyance in large cities, and especially in those which are situated at a dis-

tance from the seacoast. In Boston and New York it has been the practice to remove such waste material in scows or barges to a distance of several miles out at sea, and allow it to be discharged upon an outgoing tide. This method, however, has the objection that with strong winds prevailing toward the land, and especially in stormy weather, such material is occasionally returned, to prove an annoyance to the neighboring seacoast communities. In New York and Boston, offal, street sweepings, and ashes are disposed of in this manner, but other and better methods are in contemplation.

A common mode of disposing of the garbage or offal of hotels, restaurants, boarding houses, and private families in large cities and towns is to contract for its collection by farmers or their agents, whose farms are usually situated within ten or twenty miles from the city limits. By them it is fed to swine, and occasionally to milch cows. For several reasons, this practice can not be too severely condemned. Examinations of the flesh of 3,064 swine fed in this manner showed that 394, or 12.9 per cent, were infected with trichinæ—a much larger percentage than has ever been found among hogs fed upon sound and healthy food. (See Twentieth Report of State Board of Health of Massachusetts, p. 119.)

The feeding of such material to cows giving milk for human consumption, and especially for the supply of food for infants and young children, is also open to similar objections, especially when the garbage is, as it usually is, in a putrescent condition.

The teaming of this material through the streets and through cities and towns in the suburbs to a considerable distance in the country, by parties who are not ordinarily careful in their methods of work, frequently causes a serious nuisance to the community. Hence other methods have been introduced for the disposal of offal and garbage, by causing its total destruction by fire. These processes have been conducted for several years in the larger cities of England. The immense plant erected for this purpose in Birmingham covers several acres within the city limits, and at the time of the writer's visit appeared to be conducted in a cleanly manner and without proving an annoyance to the neighborhood. One furnace was also devoted to the destruction of the excreta furnished by the pail system—that is, the night soil from houses not connected with the public sewers.

The burning of ashes and garbage together in the destructors at this establishment furnished a very good slag or cement, which

Turn-Verein Festival.—Mass-wand exercise, three thousand participants.

(Photographed by the Milwaukee Art Gravure and Etching Company.)

is employed for the construction of buildings, stables, and concrete walks. At Chelsea, in London, a destructor of recent construction separates the materials which can be utilized, such as paper, rags, tin cans, bones, bottles, glass, and iron, while the organic refuse is converted into artificial fertilizers. A market is found for most of the separated materials, while the waste paper is converted into cardboard upon the premises.

In the United States, in addition to the furnaces recently introduced, chiefly in Western cities, for the treating of garbage by fire, other processes have been introduced having in view the utilization of those constituents which can be converted to economical use, such as the fats of garbage, which can be employed in the making of soap, while other organic matter can be converted into fertilizers.

The Hygiene of Occupations.

Certain occupations, and especially those conducted indoors, in consequence of some special characteristics of the industry, are liable to exercise an injurious effect upon the operatives employed. Hence great pains have been taken, especially in the older countries where such industries are conducted, not only to study the conditions which injuriously affect these operatives, but also to devise proper means by which such effects may be avoided.

Prominent among such occupations are those which become harmful in consequence of the quantity or character of the dust which is produced in connection with the work. Miners, iron molders, steel grinders, cutlers, needle and file makers, are especially subject to this injurious influence of dust. Cotton and wool operatives are subject to the same harmful effect of dust upon the respiratory organs.

In addition to the effects of dust as an irritant, there are other occupations in which the poisonous character of the dust is superadded to its irritant quality. Painters, plumbers, typesetters, and glaziers are found to suffer from lead-poisoning. In the employment of paper-making, the rag cleaners and sorters are not only exposed to the influence of the dust, which is often very abundant, but also to the added danger of infections which the rags occasionally introduce. Wool sorters and sorters of foreign hair are exposed to the dust and occasionally to the infection of *anthrax*, an infectious disease of the most dangerous character.

The danger in most of these employments may be greatly

diminished by thorough ventilation of factories, and other sanitary measures.

Operatives in many different departments are exposed to dangers in which the risk may in most instances be lessened by the introduction of new appliances and more careful methods of work. An excellent prize essay upon this subject has been published by the American Public Health Association.

Municipal Hygiene.

The aggregation of people in cities and towns invariably introduces the necessity of special sanitary measures which can be applied to the evils attendant upon increasing density of population. Some of these, such as the public sewerage system, the disposal of garbage, public disinfection stations, and isolating hospitals, have already been treated briefly in the foregoing summary.

As an illustration of the effect of density of population in increasing the mortality from certain infectious diseases, the following statistics, compiled by the writer from the registration reports of Massachusetts for twenty years (1871–'90), are instructive upon this point.

Dividing the 346 cities and towns of the State into three groups according to the density of their population, the first, or group of *dense* districts, consisted of cities in which there was less than one acre to each inhabitant; the second, or group of *medium* districts, consisted of towns in which there was more than one acre, but less than four acres, to each inhabitant; the third, or group of *sparse* districts, consisted of towns in which there were more than four acres to each inhabitant.

As a result of this grouping, the following table shows the effect of density in the case of each one of seven diseases. For the sake of uniformity, the mortality in dense districts is taken as a standard, and is represented by 1,000 in each case:

Mortality from—	Dense districts.	Medium districts.	Sparse districts.
All causes	1,000	826	760
Measles	1,000	517	445
Scarlet fever	1,000	818	587
Diphtheria	1,000	780	634
Smallpox	1,000	332	149
Cholera infantum	1,000	898	635
Consumption	1,000	810	727
Pneumonia	1,000	792	783

Dr. J. S. Billings states the situation with reference to American cities very concisely, as follows:

"The great majority of the dwellers in our cities have not heretofore taken any active personal interest in the sanitary condition of their respective towns. They may grumble occasionally, when some nuisance is forced on their notice, but as a rule they look on the city as a sort of hotel, with the details of the management of which they have no desire to become acquainted. They employ certain paid servants to look after municipal affairs; there is a board of health, or a health officer, whose business it is to prevent or mitigate nuisances, to stop epidemics, and to keep the death-rate low; there are engineers to manage the water works, sewage disposal, etc.; and there are newspapers to criticise and instruct the authorities upon any and every possible subject connected with the cleanliness and healthfulness of the place. The individual citizen, if he thinks about the matter at all, usually concludes that this is all that need be done; and that, if the results are not wholly satisfactory, they must be accepted as the necessary outcome of politics or the weather, and do not involve him in any responsibility. Quite recently, however, there seems to be a growing interest in sanitary matters in our cities, and people are asking whether the death-rates are higher than they ought to be, whether the city is in good condition to resist the introduction or spread of cholera, and to what extent it is worth while to spend money to secure pure water, clean streets, odorless sewers, etc." (Dr. Billings on Municipal Sanitation, The Forum, May, 1893.)

Public Baths and Wash-houses.

These excellent institutions, which may be found in every city and nearly every large town in many European countries, are yet practically unknown in American cities. A few of the sea-coast cities have free baths (salt water), in which baths can be had only in summer; but thus far the public bath, in which the mechanic and laborer can practice ablution throughout the year for a very moderate sum (a penny for a bath, twopence for warm bath, threepence for warm bath with soap and towels—two cents, four cents, and six cents), exists in no American city except New York. An excellent addition to such an establishment is a tank, in which the young of both sexes can be instructed in the healthful and life-saving art of swimming.

Public Mortuaries.

The need of public mortuaries has not yet been forcibly brought to the attention of American municipal governments, but the crowding together of the poor in small tenements, where the retention of the bodies of the dead in occupied apartments may endanger the health of the living, will necessitate the adoption of better methods than those which now exist. The following extract from Dr. J. B. Russell's tract entitled "Life in One Room," illustrates the necessities of the extremely poor.

In Glasgow, 126,000 of the population live in one-room tenements. "It is those small-roomed houses which produce the high death-rate. It is those small houses which give to that death-rate the striking characteristics of an enormous proportion of deaths in childhood, and of deaths from diseases of the lungs at all ages. Their exhausted air and poor and perverse feeding fill our streets with bandy-legged children. There you will find, year after year, a death-rate of 38 per 1,000, while in the districts with larger houses it is only 16 or 17. Of all the children who die in Glasgow before they complete their fifth year, thirty-two per cent die in houses of one apartment, and not two per cent in houses of five apartments and upward. There they die, and their little bodies are laid on a table or on the dresser, so as to be somewhat out of the way of their brothers and sisters, who play and sleep and eat in their ghastly company. From beginning to rapid ending the lives of these children are short parts in a continuous tragedy. A large proportion enter life by the side door of illegitimacy. One in five of all who are born there never see the end of their first year. Of those who so prematurely die, a third have never been seen in their sickness by any doctor. . . . I can only venture to lift a corner of the curtain which veils the life which is lived in these houses. It is impossible to show you more."

I have introduced this brief picture to show the serious effects of overcrowding in a city population, and the need of better provisions relating to the burial of the dead. In the city above named, the conditions of the poor have been greatly improved under the action of prudent sanitary legislation and the wise administration of a most efficient health official. The lesson to be learned for American cities is to secure such legislation and such administration as shall prevent overcrowding, and remedy the unsanitary conditions which already exist.

Rural Hygiene.

The urban population of the United States in the census of 1880 constituted twenty-two per cent of the total population, and during the succeeding decade it had increased to twenty-nine per cent of the whole. In the two most densely settled New England States the urban population constitutes fully seventy per cent of the total population, and the density amounts to about two hundred and seventy-five per square mile (census of 1890); but in the country at large the rural population is still very much in the majority, and must continue so for many years to come. It amounts at present to at least 45,000,000 people, and the density of population in the whole country is but little more than twenty per square mile. There must necessarily always be a large ratio of the whole engaged in the pursuits of agriculture, since the broad prairies and other agricultural lands of this large territory furnish food for its own population, and send ample supplies to foreign ports for the crowded millions of Europe.

Volumes have been written upon the public health of cities, their water supply, the drainage, the milk supply, garbage disposal, street cleaning, tenement-house hygiene, and other topics relating almost exclusively to an urban population, while very little has been said of the sanitary condition of that very large class, the rural population.

The preservation of the health of this part of the inhabitants is a matter of quite as much importance as that which relates to the dwellers in cities; and while it may be true that the average length of life of the farmer is greater than that of people engaged in other occupations, it might undoubtedly be considerably lengthened by the observance of sanitary principles. There are probably few occupations in which hygiene is more neglected. The farmer pleads that he can not afford to take the best measures for ventilating or draining or warming his house. On the contrary, he can not afford *not* to do it. An intelligent writer upon this subject states the case as follows:

"Many a man, who has plead his inability to 'spare a day' in the spring, has been forced to take a day in the fall for the obsequies of some member of his household; but not till a long and wearying sickness has taxed to the utmost the energies of all who could wait or watch, and the physician has a large but well-earned bill against him, the druggist another, and the nurse, who was called in when home aid would no longer suffice, another. Had

the sums, which are often recklessly paid out in frantic but vain attempts to detain some fleeting life, been invested in judicious methods of *prevention*, they would have been ample to underdrain the entire premises, warm every zero bedroom in the house, and pay the wages of a nimble maid all the year round." (Mrs. Plunkett, in Fifth Report of State Board of Health of Massachusetts, p. 257.)

The requirements of a healthy home may be briefly stated as follows:

1. A good location—having a sunny exposure, with dry soil, and freedom from dampness.

2. The house should be well planned and adapted to the wants of its inmates. A small percentage of the cost of construction expended in securing a good plan from a competent architect is money saved.

3. Thorough drainage and such disposal of the household waste as shall permit no harm or annoyance to any one. Neglect of this principle has often proved both dangerous and expensive to many a rural home.

4. The water supply is closely related to the last topic and is even of greater importance. The faulty selection of the source of domestic water supply of country houses proves a frequent and fruitful cause of illness in the family. It not infrequently happens that the farmhouse is provided with two wells, one at the house and another at the stable. The former often becomes contaminated by its proximity to the sink-drain, the cesspool, or the privy, so as to render its water unfit for use, while the latter in like manner receives foul drainage from the barnyard or barn cellar. In the latter case the danger to human life may be much greater than in the former, since the milk-cans which serve to transport the milk supply for a considerable part of the population of a neighboring city are often washed with the water from the barnyard well. Many local epidemics of typhoid fever in cities and towns have been traced directly to this source.

In the search for a good location for the domestic well, no exact rule can be stated as to safe distances from sources of pollution. The character of the soil, the contour of the environing water-shed, the direction of the ground-water currents, must all be considered. Water is not necessarily purer in consequence of its being found in a rocky stratum. An epidemic of typhoid fever occurred in Massachusetts in 1889, in which fifty men in one establishment were taken ill. The water supply for these men was

procured from a well situated at the base of a hill; analysis of the water showed that it was contaminated by the contents of a cesspool at a higher level, which must have passed through crevices in a ledge of rock for a distance of about fifty feet. (See Twentieth Report of State Board of Health of Massachusetts, pp. xliv–xlvii.)

Another rule which may be safely followed in the selection of domestic water sources is the following: "Avoid divining-rods, and use common sense."

Another defect in the hygiene of the rural population of the United States is that of badly selected or badly cooked food. Notwithstanding the great abundance and variety of food, both animal and vegetable, which is produced upon the well-tilled farms of New England and upon the Western prairies and fertile fields of the South, it is undoubtedly true that the food of the farmer is less varied and less wholesome than that of the urban population.

In the more densely settled States it often happens that the better and more nutritious products of the farm (eggs, and the products of the dairy) are sent to the markets of the neighboring cities, while the farmer's family is fed upon a limited and less nutritious diet. The chief defects of the diet of the rural population may be stated as follows:

Too exclusive use of fried food.

Salt meat, to the exclusion of fresh meat.

Exclusive use of fine wheat flour, in place of the coarser and more wholesome sorts of meal and flour which were largely in use a half century since.

Pork in some form is used as food by a very large part of the population of temperate climates, and when it is the product of healthy animals it is a nutritious and wholesome food for all who are accustomed to a life of toil and for those who have naturally vigorous constitutions.

Swine, however, are subject to many diseases, some of which, especially those of a parasitic nature, are communicable to man. During the past twelve years the State Board of Health of Massachusetts has examined the flesh of about thirteen thousand slaughtered hogs, among which 6.3 per cent were found to be infected with trichinæ. It has also proved that those animals which were fed upon the offal and garbage of cities were infected in a much greater degree than those which were fed on wholesome food. (See p. 566.)

It is only a few months since the writer was called to investi-

gate two outbreaks of *trichinosis* in which more than fifty persons were taken ill and five died. The disease is almost unknown among persons of American birth, since the latter invariably use pork thoroughly cooked, while the eating of raw pork is quite a common practice among those of foreign birth, especially among Germans.

Tapeworm, also, usually has its origin in eating the flesh of swine.

Ventilation.—In the farmhouses built in the last and the early years of the present centuries open fireplaces furnished excellent provision for ventilation in the winter months, but the modern farmhouse is too often built with total disregard of those principles which require an abundant supply of fresh air to the inhabited rooms. Bedrooms and sleeping chambers are usually constructed as tight boxes, with no provision for the removal of foul air except through such crevices as the carpenter has fortunately left by means of badly fitting doors and windows. In such rooms the inmates are compelled to breathe the poisoned products of their own respiration, after the example furnished by the occupants of the lower berths of a modern sleeping-car.

Much has been said and written regarding the evil results of overcrowding in tenement-house populations in large cities, but the writer has observed the same results where large families occupied small and snugly built farmhouses with diminutive and ill-ventilated apartments.

Care of Dairy Farms.

The sanitary management of dairy farms is a subject of vital importance to the welfare of city populations. The health of the milk producer and of his family, and that of the distant consumers of milk, are often very closely related. The importance of this subject will be understood when it is known that large cities like New York receive their milk from an extent of country having a radius of one hundred and twenty-five to one hundred and fifty miles; Boston, about ninety to one hundred miles; and the circle enlarges as the urban population increases.

Dr. Russell, the Health Officer of Glasgow, in an excellent paper entitled "The Sanitary Requirements of a Dairy Farm," makes many useful suggestions upon this subject which are worthy of universal adoption:

"All the arrangements of the farmhouse and the habits of life ought to have in view one cardinal principle—the separation, so

far as possible, of the domestic life from the milk in its production, manipulation, storage, and dispatch, for the reasons (1) that milk is prone to contamination from exposure to disease in the persons of those working among it; (2) the risk of contamination by disease is just in proportion to the closeness of the relation between the ordinary domestic life of the farmhouse and the structure and arrangements necessary to the business of the dairy."

Prof. Brown, of the Agricultural Department, Privy Council Office, England, in writing about the same subject, says:

"Nothing worse than the insanitary conditions of the life of the average dairy cow can be imagined."

Investigations of recent outbreaks of typhoid fever in cities have shown that the milk supply is often the medium of transmission of this disease. Four such epidemics have been investigated by the State Board of Health of Massachusetts in the past three years, in which localized outbreaks occurring upon certain milk routes in cities were traced either to infection of the milk at the producer's dairy, or, as in one case, to the manipulation of the milk within the limits of the city by a milkman suffering with typhoid fever (an ambulant case). These facts emphasize very strongly the necessity of the greatest cleanliness in all the appointments of the dairy farm, and especially of its water supply.

The Food of Dairy Cows.

Dairy cows kept mainly for milk production and not for butter are the subjects of constant experiments by their owners, the object being to secure milk in abundant quantity, its quality being a secondary consideration. Impoverished articles are largely used as food for cows, the more valuable constituents having been removed for other purposes.

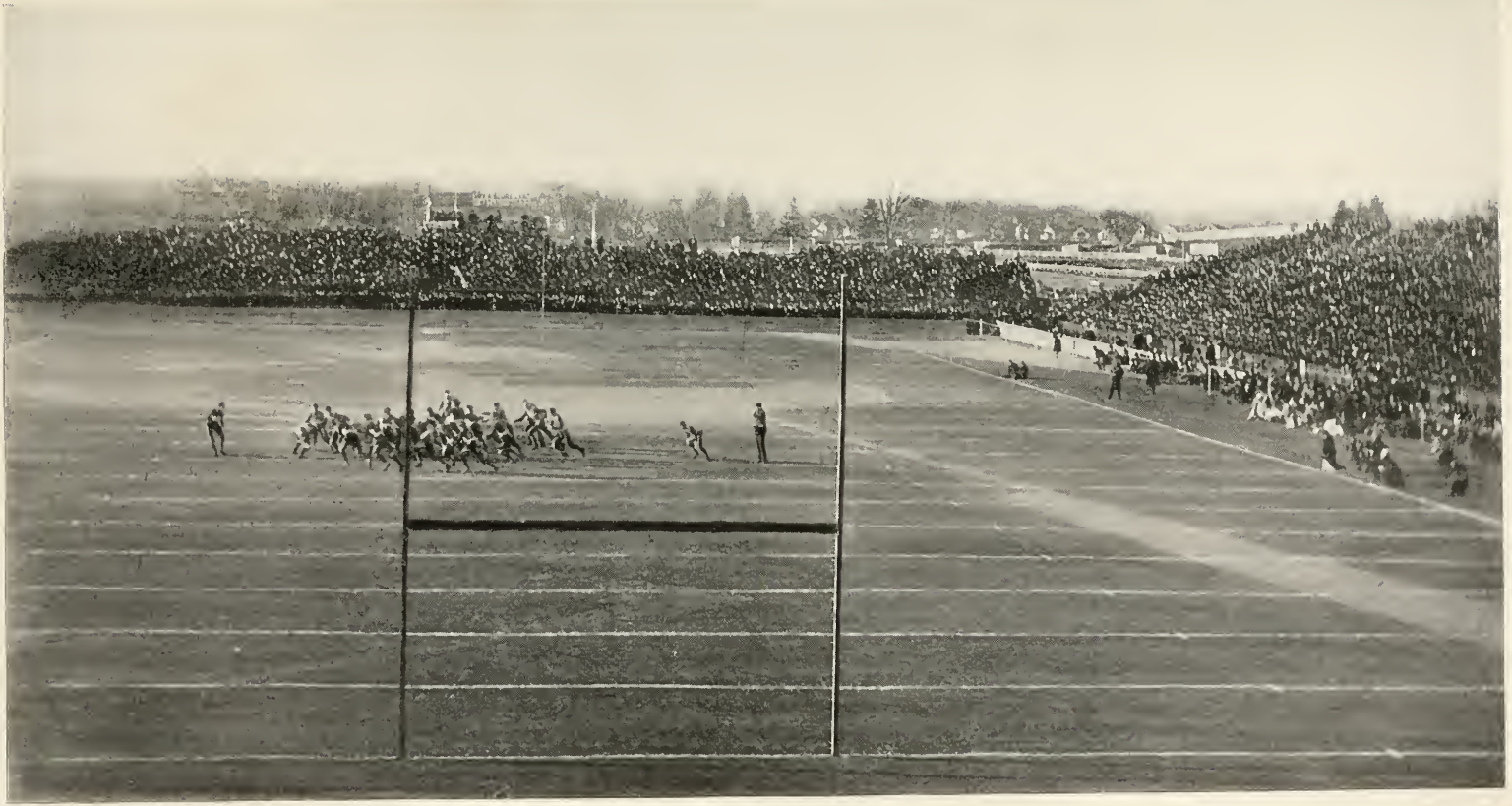
In the case of barley, the principal constituent, the starch, is removed by the maltster for the making of beer, and the cow eats the refuse, often moldy and decomposed. Indian corn is treated for the sake of the conversion of its starch into glucose, while the gluten meal which remains after the starch is removed is fed to the dairy cow. Cotton-seed meal is deprived of its nutritious oil, and the refuse again fed to the cow, all for the purpose of securing an abundant flow of milk. Thus the dairy cow becomes a mere milk machine, into which various impoverished articles of food are introduced by the milk producer, and the capacity of the animal is strained to its utmost to increase the yield of milk. It is not a matter of wonder that her average lifetime is brief.

Habits of the Occupants of Country Dwellings.

These are often dependent upon the conditions and circumstances by which they are surrounded. A scanty water supply renders the frequent washing of clothing and other material requiring an abundant use of water a difficult matter. Hence, personal cleanliness, as well as cleanliness of the house and the stable, becomes a rarer quality than it would otherwise have been under the conditions of abundant water supply which prevail in a city or large town. Warm baths, which are as essential if not more so in the farmhouse than in the city, are to be had with difficulty.

Overcrowding and Insufficient Ventilation.—The term overcrowding has been applied almost exclusively to the tenement populations of large cities, but overcrowding to a dangerous degree occurs quite frequently in the small frame structures which are often built at the present day in sparsely settled farming districts. In these dwellings, having from three to seven or eight small rooms averaging from ten feet square by seven or eight feet in height, all under one roof, are often collected families of ten, twelve, or more persons, including the hired help of the farm. At least half of the rooms are used as sleeping rooms. They are tightly built, with no provision for ventilation, and often with but a single window in each. Sometimes a small stove is introduced for heating the chamber. In such rooms improvement may be made by placing a small transom window over the door, where the door opens into an outer hallway, and by inserting a narrow strip of wood under the lower window sash, so as to allow a current of fresh air to enter between the two sashes without producing a direct draft upon the occupants.

Scarcely one week has elapsed at the present writing since the writer was called to inspect a small cottage upon an isolated farm, having twelve inmates crowded in a very small space, among whom six cases of serious illness had occurred, with two deaths, in less than one week, the rapid spread of which was partially due, in the writer's opinion, to the contracted apartments in which the family were living. The "ticketed house system" of Glasgow, in which the inhabitants of small tenements are protected by a law which fixes a minimum of cubic air-space for each occupant, might well be applied to many farm dwellings as at present constructed.



Yale and Harvard foot-ball game at Springfield, November 25, 1893.

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Outlook.

In summing up the results accomplished in the line of public hygiene in the United States during the history of the country, it appears that in some directions progress has been rapid, and has more than kept pace with the steady growth of the nation. Very much of this improvement has been effected within the past twenty years.

It is safe to say that public water supplies are now furnished to nearly one half of the population, while only fifteen years ago scarcely one fifth were so furnished.

The management of quarantine and the sanitation of seaport cities have been conducted with such success within the past twenty years as to shut out some of the most dangerous diseases which occasionally appear in the cities of transatlantic countries. In 1832, 1849, 1854, 1866, and in 1873 cholera gained admission to the United States by way of its seaports or those of Canada, but for the past twenty years we have been practically free from its invasion.

In the hygiene of schoolhouses and other public buildings commendable progress has been made, especially in the matter of heating and ventilation.

General and special hospitals and asylums for the treatment of the sick, the insane, the infirm, the crippled, and in fact for nearly every infirmity, have greatly multiplied within the past quarter of a century. It is only quite recently, however, that the principle of providing hospitals for the isolation and treatment of persons sick with infectious diseases has gained much ground in this country. The importance of making such provision in every large city must be recognized as one of the efficient means of protecting the community.

Questions which should receive special attention in the future are:

1. The appointment of a national sanitary authority, which should have supervision, and at least advisory power, in matters pertaining to the public health of the country at large, with some definite provision for representation of the States.

2. A national system of registration of vital statistics extending its authority to every city, town, and village in the whole country.

3. A systematic study of the natural history, the management and control of that class of diseases usually known as *infectious*

or *communicable*, authority being given to medical officers, in districts where such diseases are most prevalent, to investigate the causes of their prevalence and the best methods of preventing their occurrence.

4. Inquiries as to the effect of occupations upon the health of persons employed in them, with special regard to the best methods of alleviating bad conditions and diminishing the danger of exposure to them.

CHAPTER XIV.

THE PLACE OF THE INDIVIDUAL IN AMERICAN SOCIETY.

THE supreme test of any country and its institutions is the effect which they produce on individual character. If men make the nation, the nation also makes men. Not chiefly by its cathedrals, museums, and palaces, but by its homes and those that dwell therein, is any land to be measured. What kind of Americans is America making? is, therefore, the fundamental question to be asked and answered by every patriot. And this that he may ask and answer another question, What changes ought to be made in America that she may produce better men and women?

The most enthusiastic advocate of democracy may be willing to admit that if government is to be measured by immediate results, democracy is not always the best government. "Not toward the impossible self-government of a multitude by a multitude, but toward some possible government by the wisest, does bewildered Europe struggle," cries Carlyle. The advocate of democracy may believe that government by the wisest will give a wiser government than government by the all. He may concede that conflicting blunders do not always neutralize each other; that the ignorance of the many is as great a foe to universal well-being as the selfishness of the few; that the interests of the multitude are safer in the hands of an educated class than in their own hands—and still he may be a democrat. For he may believe that the end of life—and therefore of all institutions, political, social, and religious—is the development of character; and he may believe that no government is so educative as democratic government. He may be of the opinion that the blunders of democracy are worth all that they cost, since they constitute an essential element in experience, and most men learn only by experience. He may think that it is better for ignorance to govern and learn by governing, than to be governed and remain ignorance. It is quite likely, he will say, that the Indian tribes will suffer less from the possible corruption of an Indian agent than from their own inca-

pacities; but they will be kept in pupilage as long as they are kept under agents, and they will grow to man's estate by the very suffering which they inflict upon themselves. Grant that the negro is worse off to-day with the ballot than he would be without it; the ballot is a schoolmaster whose tuition may inflict penury and pain to-day, but brings wisdom and wealth to-morrow. Grant that most men are children; it does not follow that a paternal government is the best government. For self-government is the road, the necessary road, to manhood; and it is better to suffer and be strong, than to be at ease and in perpetual childhood.

I shall not in this chapter assume the truth of the proposition that democracy does exercise a better educative influence than any other form of government, neither shall I attempt to establish that proposition. To do this would require a wide and careful survey of history. It would be necessary to compare Rome as a republic with Rome as an empire, Switzerland with Italy, France under the Bourbons with France under the Directory, England under Henry VIII with England under Cromwell, and both Englands with Ireland. It would be necessary, also, to compare the autocratic with the democratic religions—Romanism with Puritanism, Rome with Geneva. It would still further be necessary to take account of other educative elements than those afforded by the government under which these peoples respectively lived—to consider the effect of race and of religious opinion. Such a study of universal history, however interesting and profitable, would involve too wide a departure from the more specific theme of this chapter. It is, however, entirely safe to assume that democracy has some educative influence on character, and that American democracy has a distinctive educative influence, partly due to its form of government, partly due to other circumstances; that this educative influence is of a mixed character, both good and evil; and that the democratic form of government constitutes one of the most important elements in the education which the nation is affording to its individual members. It is therefore necessary in the outset to consider what is the essential spirit of American democracy.

Aristotle divided government into three classes—government by the one, government by the few, government by the many. In some sense the American government is the last—government by the many. Under the American democracy one half the community—the women—are without a share in the government, to whom must be added all men under twenty-one years of age, Indians, and

other persons who from various circumstances are deprived of the suffrage. Combined, they constitute so large a proportion of the community that in the most heated national elections only about one in ten of the people votes. One tenth of the people of the United States govern the other nine tenths. None the less is it true that America has added a fourth form of government to Aristotle's categories. The fundamental idea underlying American democracy is that of self-government. Government—by which I mean the exercise of force by one person or class of persons over another person or class of persons—is regarded as a necessary evil, to be endured rather than to be desired, and to be reduced to the minimum necessary for the maintenance of individual rights. In America we submit to the exercise of force in a regular and regulated manner, only to prevent the exercise of force in an irregular and unregulated manner. We have no love for an army, but we prefer a militia to a mob. We dislike the surveillance of the police, but find it more endurable than the presence of burglars. Our American democracy is nevertheless based on the doctrine that the majority of men are able to govern themselves by the force of judgment and conscience operating from within, and therefore do not require the intervention or addition of force operating from without. If the aristocrat declares this to be a great assumption, the democrat must freely concede that it is so. If the aristocrat further contends that it is sustained neither by the theological conception of man as fallen, nor by the scientific conception of man as evolved from a lower animal condition, nor, finally, by even an impartial survey of man's historical career upon the earth, the sufficient answer for the purpose of this chapter will be, that we are not concerned here to show that the American democracy is well founded, but to consider what is its essential spirit, and what its effect on individual character. And its essential spirit is a spirit of faith in man; its fundamental doctrine is that in all normal men there is an inherent, though it may be latent, capacity for self-government, making control exercised over them needful only temporarily, and this in lesser and lesser measure as that capacity is developed by experience. Thus democracy tends steadily toward philosophical anarchism. The difficulty with the anarchist is that he anticipates—that he would build society to-day upon the assumption of the existence of certain conditions which the most optimistic can only hope will exist in the future, but which certainly do not yet exist. Self-government does not mean government of the many by the unprincipled and

criminal few. It will be time enough for the majority to dispense with the militia when education has made mobs impossible; to dispense with police when cities no longer breed thieves. But if democracy tends in the direction of philosophical anarchism, it no less tends in the direction of philosophical socialism. The same faith—if the reader please so to regard it, the same exaggerated and exuberant faith—in man which anticipates the time when he will be wholly freed from all necessity of control by his fellow-man, perceives or imagines in him a capacity for combining in common industrial enterprises with his fellow-man. Fraternalism is not paternalism. These two are antipodal. The same tendency which lessens the *powers* of government increases its *functions*. As the "night-watchman theory" disappears, the co-operative theory takes its place. Australia, the most democratic of countries, is the very country in which the people have carried combination under governmental direction and control into the largest number of activities. We have, therefore, to consider what is the effect on individual character of a pervasive faith in man as man—a faith which perceives, or thinks it perceives, in him such power of self-government as may well emancipate him from the control of others, and at the same time fit him to combine with his fellows in common undertakings for mutual benefit.

If this were our only problem, it would be a comparatively simple one. But, in considering the effect of American democracy on individual character, we have other elements to take into consideration. We have to take account of the fact that the nation is new, and accordingly without the inconveniences on the one hand or the safeguards on the other of national traditions; that its unparalleled natural resources afford unparalleled opportunities for the accumulation of material wealth; that its origin was essentially religious—Puritan in New England, Reformed in New York, Quaker in Pennsylvania, Roman Catholic in Maryland, Anglican in Virginia, Huguenot in the Carolinas; that thus the country has had in a marked degree the advantages of historic Christianity in its most widely different forms; and that into this country have come, by emancipation in the South and by immigration in the North, vast populations wholly untrained in self-government, to learn its simplest and most fundamental lessons by experience of its difficulties, its dangers, and its benefits. To combine these elements in a single sentence, we have to consider what is the educative effect of the spirit of democracy upon an untrained population, but under favorable social, industrial, and

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religious conditions; what, on the one hand, are the dangers against which we must guard, what elements, on the other hand, are favorable and helpful.

The spirit of democracy is a spirit of faith in man; its appeal is to man's self-esteem. It ignores all distinctions of class, it denies all distinction of caste. It emphasizes the importance of environment and undervalues heredity. To every man its message, as interpreted by American press and platform, is something such as this: "You are a man with inalienable rights and inestimable possibilities. You are a son of God; you need no priest to mediate between you and your Father; no ancient prophet or book to declare authoritatively his word or will; for you can hear his voice yourself, and interpret to yourself his will. You need no ruler over you; you are capable of self-government. All public rulers are public servants, and all governments derive their just powers from the consent of the governed. Your judgment is the all-sufficient guide; your will the only authority; your voice speaks the last word, for the voice of the people is the voice of God. All science, art, music, literature, religion is to be tested in the last analysis by its adaptation to your needs, all judgments to be pronounced by you, all awards of approval and condemnation to be your awards. All monopolies, whether of culture or of wealth, whether immaterial or material, are violations of the true and normal order of society; schools, churches, museums, colleges, art galleries, libraries, are to be open to all. Books are to be printed and sold that all may read. The world's wealth is yours; the highways are for your traffic and under your control; the land and its contents belong to you; and, when you come by your own, taxation will cease, for the public wealth is adequate to meet all public expenses." Such are the various forms of the message which democracy utters to the people, as variously interpreted by its various prophets; part of it true, part of it false, and part of it an admixture of truth and falsehood.

Now, the first effect of such a message is to awaken that self-esteem which is latent in every man, and its next and natural if not necessary effect is to turn the virtue of self-esteem into the vice of self-conceit. Every vice is an exaggeration or a misapplication of a virtue. No virtue is more easily developed than self-esteem, and no virtue is with more difficulty guarded against growing into its vicious development. The conceit of the American is not so grotesque as it was when Charles Dickens caricatured it in Martin Chuzzlewit. The serious problems of our na-

tional life have done something to sober us. Increasing facilities for travel, increasingly taken advantage of, have done something to teach us that other nations possess excellences of administration and virtues of character which we may well covet. Ignorance and self-conceit generally go together, and a broader education has done something to better our perspective. And, finally, if we have not always taken kindly the satires of foreign travelers, or even those of our own satirists, we have profited by them. Yet still an extravagant estimate of America and Americans is painfully common in the public press and public addresses. Humility is not an American virtue, and is not likely to become so without years of further education and some hard experience.

An inevitable accompaniment of the vice of self-conceit is the kindred vice of irreverence. Indeed, the two are one and the same vice, presenting to the observer different aspects. Self-conceit is an overestimate of one's self, and irreverence is an underestimate of one's superiors. It would, perhaps, be truer to characterize the American vice as unreverence rather than irreverence —that is, it is negative rather than positive. In England every one looks down upon some one below, and every one except the Queen looks up to some one above. In America we all look off. There is no social up and down—at least, none that is enduring.

Some communities—like Boston, New York, and Philadelphia —make a brave attempt to maintain a respect for "old families," but this is an inheritance from colonial days, and visibly wanes. American society is a pot on the fire boiling; what is at the bottom to-day may be at the top to-morrow; what is at the top to-day may be at the bottom to-morrow. The towpath driver or freight handler may become a millionaire and railroad king, and the son of the millionaire and railroad king may become a herder of cattle on the Colorado plains. Such reversals as these not only may be but have been and are—not once or twice, but with sufficient repetitions to make them characteristic phenomena. The lawyer and judge next year may change places, and the judge of yesterday plead before the lawyer to-morrow. A change in elections makes the subject a ruler and the ruler a subject. Respect for the scholar who stands at the head of the class gives place to an eager ambition to get his position. On class day at Harvard University a wreath of flowers is twined around a tree in the college yard just above the reach of the longest-limbed. Then the class struggle with each other to grasp it and carry away some floral trophy. If a broad-shouldered athlete gets close to the tree, it is

an even chance if his back and shoulders are not seized upon by some more agile fellow as a vantage ground for plucking a prize. This vivacious and wholly good-natured struggle is not an inapt symbol of American life; the cynic might add that the crushed and ruined handful of flowers is not an inapt symbol of the American prizes. Such a life does not promote reverence for superiors. Even the Church feels the influence of this democratic spirit. Respect for the "cloth" is little known in America. Even in the Roman Catholic Church it is much less than in the Old World, and in many of the nonliturgical assemblies the spectator can hardly recognize a feeling different from that of the lecture hall or the concert room; even the prayers come dangerously near patronizing the Deity. In irreligious circles this unreverent spirit finds full expression—as in the resolution of the Chicago anarchists—"Resolved, that we have no use for God."

Irreverence for superiors—or, to speak more accurately, a serene assumption that there are no superiors—almost inevitably breeds a contempt for authority, with a very material qualification to be hereinafter mentioned. Self-government is the best of all government; but it is subject to this disadvantage, that when the self is unable to govern, through ignorance or passion, he is not easily governed by one wiser than himself. American communities are at once the most law-abiding and the most lawless. There are certain standards of morality established by the common consent of the people. This unwritten law enforces itself with an almost absolute and inflexible authority. When, as is generally the case, this unwritten law corresponds with the statute law and with fundamental principles of ethics, the result is most felicitous; but when it comes in conflict with either, the maintenance of the statute law or the higher ethical principle becomes exceedingly difficult. We have no other standing army than is required to guard our borders, and the police forces in our great cities are ordinarily required only to deal with the criminal class. The great crowds which congregate on special occasions keep themselves in admirable order with very little surveillance from the police; but if the crowd, or the community, has for any reason seen fit to adopt a standard of its own, it is with great difficulty kept in subjection. Let this crowd, for example, be one which has enacted the unwritten law, which Mr. Carnegie has formulated for the American laborer in the phrase, "Thou shalt not take thy neighbor's job," and the sheriff can get no *posse comitatus* adequate to protect the indisputable right of

a nonunion laborer to accept the place which the striker has vacated. Nor is this almost contemptuous disregard for law, as formulated in statutes and institutions, confined to one class in the community. Some of the best citizens of New Orleans were involved in the lawless hanging of the Italian prisoners, and some of the wealthiest cattle owners of Wyoming were implicated in the endeavor to execute capital punishment, by private enterprise, on supposed cattle stealers.

Clearly akin to this disregard of external authority is a quiet setting aside of tradition and traditional authority. Democracy has turned its back upon the past and set its face resolutely toward the future. The past has given the common people very little, much less than their share; at least, so democracy thinks. The common people, therefore, in so far as they have accepted the teachings of democracy, are disinclined to continue the methods of the past; that a certain doctrine has been always believed or a certain practice always maintained they are inclined to consider rather a reason for abandoning than for continuing it. Evolution, not revolution, is the true law of progress; but democracy is slow to see this. We meet, therefore, all sorts of extravagant statements, as that the servitude of the workingman under the wages system is worse than that of chattel slavery, or that in America the poor are growing poorer and the rich are growing richer, or that Calvinism is worse than atheism. This is not mere rant. It is quite as often the sincere expression of men whose limited culture has given them a false perspective; who do not understand that the future must grow out of the past. The American is more apt to think of the past as something to get away from than as something to tie to or even to grow out of. He respects the Constitution only as the expression of the wisdom of his fathers, if, indeed, he respects it at all; and he is quite as likely to think an ancient creed valuable as suggesting what he should not believe as indicating what he should. By a natural reaction, traditionalism nowhere exhibits so much vigor as in America, especially in the churches. Men who distrust democracy, who do not believe that it is able to care for itself, conduct its own investigations, and arrive by independent processes at the truth, are very insistent that their fellows shall be bound by tradition; but they fight a losing battle, and are steadily driven from one reserve line to another; for the attempt to compel a people to be bound by the past, when they have deliberately set themselves the task to break away from that past and create what

they hope will be a nobler and better future, is an attempt which can not succeed. Traditional bonds will be weak so long as the democratic experiment continues. It is hardly necessary to point out that the same spirit of indifference to the past—hardly active enough to be called a spirit of contempt—makes American society the most unconventional society in the world, except where it has, by interchange, caught the fashions of the Old World, and imitates without understanding or even considering them.

It may not be quite so clear why democracy should pay little heed to the future; but the reason is the same—its general faith in humanity. As it does not think that the fathers knew so well what this generation needs as we know, so it does not believe that it knows what the future generations will need so well as they will know. Everything is temporary. If we make a constitution, we put in it a provision for changing it every ten or twenty years. "I accost an American sailor," says De Tocqueville, "and inquire why the ships of his country are built so as to last but for a short time; he answers without hesitation that the art of navigation is making such rapid progress that the finest vessel would become almost useless if it lasted beyond a few years." He who builds a country home does not really expect that his children will occupy it; he who lays out a road has a secret misgiving that in ten years a railroad will take its place. Everything is built for to-day, without deference to the authority of the past and with great uncertainty as to its fitness for the future.

To these elements of danger in American democracy must be added two others—discontent and materialism.

So long as a man conceives no better condition of life than that which he enjoys or suffers, or so long as he conceives improvement to be wholly impossible to him, so long he is quiescent if not contented. Revelations of better soil and climate in the planet Mars than any we possess would do something to make us discontented with this earth; but the discovery of some way by which we could be transported to Mars would immeasurably enhance the spirit of discontent. The message of democracy to the common people, "You can be better off than you are," makes them discontented with what is and has been. This consideration explains the otherwise anomalous but certainly undoubted fact, that the better off men are the more likely they are to be discontented. There is more restlessness and discontent among the blacks of the South to-day than there was during slavery. The promise of Home Rule has greatly intensified the eagerness of the Irish to get it.

It is not among the poorest-paid and the hardest-worked laborers that strikes arise. Nihilism flourishes among the middle and higher classes of Russia, not among the recently emancipated serfs. One of the most patent symptoms of American life is its restlessness, its dissatisfaction with what has already been accomplished, its eager anxiety for something more. Contentment—true contentment—is a virtue almost as rare in America as humility. Our life gives no birth to a Shepherd of Salisbury Plain. If this discontent were spiritualized, we could gladly welcome it. But it is largely, as yet, discontent with material conditions, and eager desire for better ones. In the evolution of the race, as of the individual, the body precedes the soul. The eagerness of America is not for character but for possession. The American people are not miserly, but they are covetous; partly because they wish to possess, partly because possession is the symbol of success, and they wish to succeed. Get rich, honestly if you can, but at all events get rich, is the unconfessed counsel which a great many Americans give to themselves. The appetite grows by what it feeds upon. And the fact that one poor man has in ten years become wealthy, so far from leaving the hundred at the work-bench contented because there is a chance for them also, excites at once their discontent and their ambition. They perceive the advantages of wealth and greatly exaggerate them; they see no reason why it is not as possible for them as for their neighbor, and they do not perceive at what cost or by what methods it is to be obtained.

Hence the almost universal gambling mania, from the boys pitching coppers in the street to the brokers gambling for thousands on 'Change. Hence, too, the corruption in public and private enterprises, perhaps not greater than in aristocratic countries—perhaps, indeed, not so great, but certainly more diffused. And this twofold evil—discontent, manifesting itself not in noble aspiration but in a vulgar eagerness to get rich—will be greater before it is less. Americans may be roughly divided into three classes: First, those who have a competence or more and are contented with it, and are giving their energies to nobler ends than food, raiment, and shelter; this is the smallest class. Second, those who have a competence or more and are not contented with it, but are giving their energies to increasing their substance; this is the next larger class. Finally, those who have not a competence, whose life is one of constant denial of legitimate desires for themselves or their children, and in whom is awakening, or soon

will be awakened, eager covetousness, often mistaken for ambition, and more often intermingling with ambition; this is the largest of the three. The scramble in America for its valueless prizes is likely to be harder and the emulation more bitter before it becomes less so.

If these vices were the only or the chief product of democracy, he who clearly perceives them might well become an aristocrat, if not a pessimist. He might well deprecate that modern movement toward democracy which is by no means political only, but is pervasive and atmospheric, revolutionizing systems of education, the forms if not the creeds of religion, the operations of industry, the very ends pursued in the arts and sciences, the social structure and life, and the individual character. But he who believes in democracy because he believes in humanity, need neither shut his eyes to these evils nor despair of human progress because they exist. He recognizes them frankly, measures them fearlessly, and desires to measure them accurately; but they appear to him to be incidental to the evolution of man. Some of them are but the immaturities and awkwardnesses of early stages of growth. Others are more serious, and may prove fatal if they are not corrected and counteracted. But the distinguishing characteristic of democracy is its power to promote the growth of humanity, and in that power the believer in democracy sees a promise and pledge for the future. Democracy will in time cure the very vices which it has produced. Indeed, in these very vices themselves the optimist sees the existence of a possible excellence as in certain weeds the experienced agriculturist sees the evidence of a valuable soil.

The first appeal of democracy is, as I have said, to the self-esteem of man. But self-esteem, though it easily degenerates into the vice of self conceit, is not itself a vice. It is, on the contrary, not only a virtue but the foundation of virtues---one might almost say, of all other virtues. No man is likely to rise higher than his ideal; if, therefore, he has a mean conception of himself, his realization in character and conduct will be mean. If he thinks meanly not only of himself but of humanity, he will be without any rational incentive to promote the progress and true welfare of humanity. And he can hardly do other than think meanly, if he thinks at all, of the Creator who has made such an ignoble herd. Thus, without respect for one's self, one can hardly possess respect for his fellows or even a rational reverence for his God. He may have the fearing reverence which appalls and paralyzes, but not the wor-

shiping and loving reverence which inspires. He can hardly have hope for either himself or others, for he will see in neither any ground for hope of a greatly better future. He will live his dull routine in a stolid content which is akin to despair. It is indeed prevented from being despair only by his hopeless incapacity to conceive of any better condition to despair of. And this is very much the condition of the fellahin of Egypt, the lower caste of India, the serf population of Russia, and the peasantry of some other parts of Europe. The only message which can arouse such a people from their lethargy is one which addresses itself to and arouses their self-esteem, gives them a better conception of themselves and their fellows, creates in them a faith that they are intended for something better than a life of drudgery, but little removed from that of the beasts, who sometimes dwell under the same roof at night and are harnessed with them to the same cart or plow by day. This self-esteem awakened, awakens in turn faith in their fellows, and thus prepares for an intelligent faith in a God whose image they can see only as it is mirrored, however imperfectly, in their own experience. Out of this faith grows spontaneously and necessarily a hope of better conditions which serves as an incentive to strive for them. And as this is a faith and hope not in themselves only, but in humanity, and in themselves only as a part of humanity, it leads gradually, though it must be confessed very gradually, to an interest in the welfare of others, and a belief in that welfare as possible—a belief which, if it be not true benevolence, is its foster-mother.

The first result of this awakening life is energy—"energy without which," says Goethe, "no two-legged animal is a man." The intense activity of the American people may be partly due to a stimulating climate, partly due to the newness of the country, partly due to its resources so great in proportion to the present population; but a deeper and more effective cause is that faith and hope which the spirit of American democracy inspires in every American heart. The foreigner leaves in the Old World the deadly lethargy, sometimes mistaken for content, which enthralled him; he begins life in the New World with great expectations, if not for himself at least for his children. The difference between the poorer wards of New York city and of London in this respect is very striking. The poor of London are going down. They have come from better conditions and are sinking into the "submerged tenth." One of the chief problems of charity, as Mr. Charles Booth has very clearly shown, is to prevent

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the poor from becoming paupers. The poor of New York are climbing up. They are generally better off than they were, and they are eager and hopeful of being still better off. A young physician, who is getting himself established in the latter city, tells me that he began a few years ago his practice among the poor: at first he had no income; now he keeps a horse and carriage and keeps it busily employed; and some of his best-paying families are those who five years ago could not pay anything. An experienced landlord in Boston tells me that the Irish, whose reluctance to pay rent in Ireland is a national characteristic, are, when sober, the best tenants and the most prompt in payment. The restless ambition which characterizes the fermenting mass of people in the crowded wards of our great cities may be regarded by the theoretical moralist as a worse vice than the dogged patience of the poor in the crowded wards of London. Nevertheless, the American vice has in it more hope of the future than the English virtue. Writers in popular magazines deprecate the decadence of New England, whose farms are falling into the hands of the Irish and whose factories are being operated by the Canadian French. This may be bad for New England, but it is not bad for humanity. The boys and girls who have deserted the shallow-soiled farms of New England have left only to improve their condition; the Yankee factory girls of the last half century are the school teachers of this; and the Irish and Canadians have come from poor wages and wretched hovels to good wages and comfortable homes. Civilization is to be measured not by its status but by its tendency. The energies of Americans are often too eager and restless, are sometimes frittered away in useless endeavors, are sometimes misdirected. But any movement is better than none at all, as the bungling efforts of a child to walk are more hopeful than the resigned relinquishment of all effort by the paralytic.

This energy so characteristic of the American makes him audacious in attacking problems the most difficult. Nothing daunts him. He is at the same time fighting a civil war of the most gigantic proportions and building an iron highway across apparently impassable mountains to bind the Eastern and Western coasts together. It is his general belief that whatever needs to be done can be done. "Nothing is impossible on Bunker Hill," becomes a national motto. It is true that this expectant ambition sometimes takes on forms that are pernicious, as when it is a sordid ambition to amass wealth for wealth's sake; and sometimes

forms which are ludicrous, as in the conventional statement to the schoolboys that they can all become Presidents. But time and experience are already doing much, and will do more, to correct these incidental evils. It is much easier to direct aright a misdirected energy than to create the energy where it does not exist.

And American energy is by no means exclusively materialistic. It shows itself in efforts for intellectual and spiritual progress no less than in those for material well-being, and far more than in those whose only product is vulgar ostentation. It is true that China has a school system which is older than Christianity; and it may be true that the school system of Germany is superior to that of the United States. But nowhere, unless it be in Australia —a country where democracy is more aggressive and advanced even than in our own—is there as much public and popular interest in systems of education as in our country. The people in the school district vote the tax, select the teacher, administer the system. No tax is paid with less grumbling than this self-imposed and always direct tax. The students of political economy doubt the wisdom of maintaining colleges and schools of the higher grade out of the public fund, but are habitually outvoted by the masses whenever the question is fairly presented. Compulsory education is not necessary except in those communities in which industrial conditions drive the children at too early an age into the mine or the factory. No sooner is the power of control taken from the aristocrat of the South, than the people establish public-school systems in every one of the late slave States. No sooner has democracy obtained the ear and made its appeal to the late slave population, than they begin to throng the schoolhouses, which are all too few and too small for the eager pupils. Nowhere outside of America—except, possibly, in Australia—is as much intelligent energy shown in eagerness for education as in the United States. And though certainly as yet our endowed institutions for the higher learning do not compare with those of the Old World, if we remember that we have only a century behind us, that during that time we had a continent to tame, a government to form, and a system of primary education not only to establish, but to maintain and enlarge with a rapidity commensurate with the increase of our population, it must be conceded that such institutions as Harvard, Wellesley, Smith, Yale, Columbia, Bryn Mawr, Princeton, Johns Hopkins, Oberlin, Chicago, Leland Stanford, not to mention a host of other and smaller colleges and universities wholly dependent for their endowment on private

benefaction, are noble monuments to American ambition and energy.

The spiritual life of the United States differs from, but is not inferior to, that of the Old World. It is true that we have not, and probably never shall have, edifices comparable to the Old World cathedrals, or services equal in æsthetic beauty with those which make worship in those cathedrals such a delight to ear and eye, if not to heart. Democracy will not produce cathedrals. Their maintenance in England is dependent upon past endowments, and it is one of the common arguments against disendowment that it would involve the serious curtailment if not the abolition of the cathedral churches. There is no present interest in England adequate to maintain them, either because they do not serve any end sufficient to compensate for their cost, or because democracy does not perceive the end, and therefore is not willing to provide the cost. Religion in democratic countries takes on a different form and finds a different expression. But nowhere is spiritual energy more apparent in spontaneous movements for the expression of the religious spirit and the cultivation of the religious life than in democratic America. Here have sprung spontaneously into being such popular religious movements as the King's Daughters, the King's Sons, the Woman's Christian Temperance Union, the Young People's Society of Christian Endeavor; and here has reached its fullest and best development the movement transplanted to our shores from England represented by the Young Men's and the Young Women's Christian Associations. "How as to the Salvation Army?" the reader will inquire. The Salvation Army is English, and does not equally flourish in America. But it is clearly in England a product of democracy, and if it fails to flourish in America, it is chiefly because our proportion of population not already reached by other organizations is so much smaller than in England. More important than all these movements is that universal one which maintains in vigor churches of various faiths and forms without any aid from Government. In substantially every Western village of any considerable size, the finest buildings in the town are not the warehouses and stores consecrated to wealth, nor the theater or opera house devoted to amusement, but the schoolhouse and the churches. Religious life is in no country more aggressive than in America, where it is wholly spontaneous and free. Religious statistics are confused and contradictory; the excessive individualism which democracy tends to produce has multiplied secta-

rian churches beyond all reason; the democratic tendency toward irreverence and unconventionality which I have already noted, coupled with the priestly and traditional spirit which remains in most church communions, has either operated to disaffect the people toward the churches, or to make the churches indifferent if not contemptuous of the non-church-going people; but in spite of these difficulties and disadvantages, church membership has grown faster than population; and what is more important, the churches themselves, of all faiths and forms, imbibing the spirit of democracy, are beginning both to preach and to practice the second half of the angels' Christmas gospel, "Peace on earth, good will to men," while not forgetting the first half, "Glory to God in the highest." Whatever the critic may think of these somewhat conflicting tendencies, and with whatever admixture of foreboding he may look forward to the future of the Church in America, he at least can not doubt that the religious energy of the American democracy is far greater than that of the common people in any monarchical or aristocratic government of the Old World.

This energy so characteristic of American democracy is full of the spirit of hope which gave it birth. The American people are a hopeful people. Their faces are set toward the future. Let any one stand on one of our great highways and watch the countenances of the passers-by; the language written on most of them is that of eagerness, ambition, expectation, hope. Let him especially contrast the faces of the women of what would be called the middle class with those of women of the same class in England or on the continent. He will certainly see less repose, but also less dull hopelessness. He will see the eager, restless eye, but also the glad anticipative illumination. Let him contrast two such congregations as that of Mr. Spurgeon, on one side of the water, and that of Dr. Talmage or Mr. Beecher, on the other. The faces tell very different stories. And this hope, combined with and giving inspiration to energy, make a character strong in the elements which promote progress. America is an army not in camp but on the march. Americans are always dissatisfied with what is and has been, because they expect something better. We used to be content with a train which took us from New York to Boston in eight hours; now we are not content with three express trains daily, which make the run in five and three quarter hours.* This spirit has its inconveniences and its moral

* Since this chapter was written the time has been reduced to five hours.

disadvantages and dangers, which I have already indicated; but it has one radical and essential good: it leads always onward and upward to a better to-morrow.

Some signs of this progress I have already indicated, others there are in abundance; the only difficulty is to select a few illustrations from among so many. We complain of the irreverence and inattention of our worshiping congregations, but we do not have to employ a church official to tickle the noses of the women and to rap the heads of the men, as was once done in New England, to keep them awake. We condemn vulgarity in the public press, but he who will compare Puck, Judge, and Life of to-day with the history of American caricature by Mr. Parton will be forced to admit that the vulgarity of to-day is a diminishing survival of an ancient vulgarity. Our cities are ill-governed; but he who will spend an hour or two in one of our great libraries looking over the daily press of half or three quarters of a century ago, will rise from the perusal convinced that our streets are cleaner, our police more efficient, our fire and health departments incomparably better than those of our fathers, while our public parks are all, or nearly all, the creation of the last half century. Extravagance appears to have increased, but if one reads the laments of Puritan divines over the extravagance of their age, or the statutes attempting to curtail it, he will question whether it is really relatively greater considering the greater wealth we have to expend. Men still live who can remember when liquor was sold or given away in every country store and ladled out at every haymaking; when drinking mortgaged many a New England farm, disgraced many a Puritan wedding, rioted at funerals, and even introduced its odors and its sloppiness at church ordinations; and I can remember when New-Year's calling in New York city was the occasion of gentlemanly drunkenness in the best circles of that city, where drunkenness in good society now has at least the decency to hide its head. I need not go on. The reader who wishes to know whether the spirit of American democracy is one of real progress in the moral and spiritual realm, as well as in the material, need only compare the history of the early years of this country, as furnished by such a picture of popular life and manners as is afforded by McMaster, with his own observation of the life of to-day, to assure himself that, in spite of an immigration perilously great, the American world is growing better. And if, instead of confining his comparison to the America of to-day with the America of the close of the eighteenth century, he will com-

pare the condition of the people of America to-day with their condition as they existed in the Old World at that time—and this is the only just comparison—the progress in intellectual and moral quality is almost inconceivably great.

There is one respect, indeed, in which the pessimist will insist, with considerable show of reason, that democracy has had an influence wholly injurious, and it is a respect so important that he may perhaps claim that it overbalances all other indications. "Where," he will ask, "is there to-day a daily press the equal in moral and intellectual quality to that founded and maintained by Greeley, Raymond, Bowles, and the editors of their generation? Then, the editorial sanctum controlled the counting-room; now, the counting-room controls the editorial sanctum. Then, newspapers were established and maintained to advocate principles; now, to make money. They have lost in editorial power as much as they have gained in journalistic enterprise, and are as much less influential in molding public sentiment as they have increased in size. In short, the newspaper has changed its function. It was a leader of public thoughts and a teacher of the public mind; now it is a mirror held up to the world, and reflecting as in a Claude Lorraine—and the glass, it must be confessed, is not always a flawless one—what has occurred upon this planet the day before." But this is not so wholly bad a sign as it sometimes seems to be. It indicates two things: First, our public-school system has educated a vast number of men to read who have not yet learned to think. The thoughtful paper, therefore, debars itself from the greatest circulation. When from any community are separated, first, all the men who do not know how to think and who wish to read without reflection; second, all those who are in too great a hurry to think—at least, on their way in the cars to business—and who wish simply to know what has happened and to reserve reflection upon it for the future—a future which unhappily may never come to them; —and, finally, those who prefer to do their own reflection, and wish a paper only to tell them what has happened, not what they should think about it—the constituency left, who wish in one and the same journal a newsmonger and a thoughtful interpreter of the news, is not large. For myself, I anticipate that so long as the present educational processes continue to make readers who are not thinkers, so long the daily press will continue much as it is to-day; but I am also convinced that the same processes of education, further continued, will create

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out of present readers future thinkers; and when that stage in democratic evolution is reached, the result will be seen in a press less partisan, more judicial, and combining, with enterprise in gathering the news of the day, intellectual ability to apprehend its significance, moral vision to see its relation to eternal and immutable principles, and skill to interpret it in clear and compact English.

It remains to speak of one additional virtue—and a very important one—which democracy tends to cultivate. Aristocracy appeals to self-esteem, as does democracy, but, unlike democracy, it so appeals to self-esteem as to create caste distinctions. Each caste looks up with a *quasi*-reverence to the one above, but it also looks down with a *quasi*-contempt upon the one below. Class feeling is cultivated—not a feeling of human brotherhood. The lord may feel kindly and act generously toward the serf, but he neither feels nor acts toward him companionably. One of the most radical declarations in the New Testament is that of the apostle John: "Ye also have fellowship with us; and truly our fellowship is with the Father, and with his Son Jesus Christ." This is spiritual democracy in its supreme form—fellowship with God, and therefore fellowship with one another. This universal fellowship can not exist in an aristocratic community, and can not be absent from a truly democratic community. The slaveholder may, and often does, have a kindlier feeling for the "mammy" who nursed him than any one can possess who has not been educated in the slave school. But so long as there lingers in the Southern community any remains of the old caste feeling, so long *fellowship* between ex-slaveholder and ex-slave is impossible. Now, democracy does not merely say to the individual, You are a man; it says at the same time, Your neighbors are men also. Its message is generic. In declaring the manhood of all men, it declares the brotherhood of man.

Liberty, equality, fraternity, are not an accidental correlation of words; they naturally and necessarily go together. When Christ told his disciples to call no man master on earth—that one was their master, even Christ, and all they were brethren—he declared one principle in three statements which stand or fall together. It is because there is one Master in heaven that we are to call no man master; it is because we are to call no man master that we are all brethren. Thus democracy tends to create a public feeling, as aristocracy tends to create a caste feeling. It fosters public opinion and gives it force and power—sometimes

excessive force and power. It makes, or tends to make, religion humanitarian, to combine with the worship of God the service of men, sometimes to substitute the service of men for the worship of God, and so to measure all religious forms and opinions by their effect on humanity. It tends to make art and science practical, and to measure practical utility by the number of people benefited rather than by the degree or quality of benefit conferred. It produces no greater artists than the ancient times; but it invents chromos, lithography, and photography. It writes no greater books, perhaps none so great, but it prints Shakespeare in editions which the poorest can possess. It does not surpass an Oxford or a Cambridge University, but it creates a Chautauqua. Above all, it tends more and more to promote public combinations for public well-being, and to unite men in common enterprises for common benefit. It fosters corporations and trusts, farmers' alliances and labor unions, for it creates a spirit of mutual confidence which makes such organizations possible, and, when that confidence is deserved, profitable. Men intrust their fortunes to a few hands or a single hand; men without capital intrust their labor to a few hands or a single hand; and though the first are sometimes wrecked by dishonesty or folly, and the latter frittered away by uncalled-for strikes, neither corporations nor labor unions perish. The spirit of confidence can not perish until democracy perishes; and those who expect to carry forward combinations until the entire community is combined in great industrial enterprises—as in Australia, where the state owns and operates the railroads—are much more nearly in accord with the spirit of this democratic age than those who hope to break up combinations altogether by legislation against trusts, and by denunciation of corporations as monopolies and of labor unions as labor despotisms.

Let me, then, sum up the results of this survey in a closing paragraph.

Since the final end of life is the development of character, government is to be tested, not by the temporal and immediate advantages which it may afford, but by its power to promote the development of true men and women. No government accomplishes this end so effectively as democratic government. Since democratic government is self-government, it introduces every man into the school of experience—of all schools the one in which the training is most thorough and the progress most rapid. The first appeal of democracy is to the self-esteem of a people who have thought but meanly of themselves, or not thought at all. Its

first effect is to throw the responsibility of life upon men who have not been prepared for that responsibility by any previous education. Its first results, therefore, often seem disadvantageous and even disastrous. It produces self-conceit, irreverence, disregard of the experience of the past as embodied in historical traditions, self-will and consequent lawlessness, and an eager and restless spirit of ambition. And since under self-government the nation is guided by men without experience, national history under a democracy is always liable to be marred by grave and even dangerous blunders. But these are the incidental evils which necessarily accompany the first stages in evolution from a state of pupilage, if not of serfdom, to a state of liberty and manhood. The beneficial results of that education which self-government alone can afford are, on the contrary, both fundamental and enduring. This school awakens in its pupils faith, first in themselves, then in their fellow-men; that lethargy which is akin to despair is supplanted by a great hope which becomes the inspiration to great achievements. Responsibility sobers the judgment and steadies the will of the growing man; his blunders and their consequences teach him lessons which, learned in the school of experience, he never forgets; and the faith and hope which have been aroused in him bring faith in and hope for humanity, not merely for himself. A public opinion is thus created which is stronger than standing armies, and a spirit of mutual confidence and mutual good will is fostered, which, though not disinterested benevolence, and still less a substitute for it, tends to its development. Thus the gradual and increasing effect of democracy is to give to its pupils, in lieu of a faith in some unknown God, faith first in humanity and then in God, as witnessed in the life and experience of humanity; in lieu of a reverence for a few elect superiors, respect for all men; in lieu of a lethargic counterfeit of contentment, a far-reaching and inspiring though sometimes too eager hopefulness; and in lieu of an often servile submission to accidental masters, a spirit of sturdy independence and mutual fellowship. So does democracy, though by very gradual and often conflicting processes, produce the liberty of a universal brotherhood, and possess the secret of public peace, the promise of public prosperity, the hope of social righteousness, and inspiration to illimitable progress.

CHAPTER XV.

THE SUMMING UP OF THE STORY.

In the chapters of this book the reader has been presented not with a history but with a picture of the conditions of our American people as determined by their ability, their energy, and the circumstances which have surrounded them. It remains to sum up certain parts of the story, and to consider a few points which have incidentally received less consideration than their importance demands.

First of all let us note that the body of our people belongs to a stock which was nurtured in northeastern Europe and acquired its civilized character in the several states of that continent. This great European branch of the Aryan race was more fortunate in its place of nurture than any other people, for it fell heir to the part of the great continent of the Old World which was peculiarly fitted to be the cradle-land of a race.

The key to the swift conquest of the continent by the immigrants from northern Europe is to be found in the rapid development of the economic arts, and mainly in the inventions which pertain to transportation. In the old method of conquering a wilderness the people had to struggle into the wilds along such roads as rude Nature afforded. There, with no other material help from the culture which they had left except their weapons and simple tools, and with no intellectual resources save those of tradition, they had to plant civilization anew. The railway and the steamboat changed all this for the better, and kept the folk of the frontier in a position where they were sustained by all needed aid from the older seats of culture. These agents of conveyance have enabled the settlers in the new lands at once to turn the precious woods of their forests, the fertility of their virgin soils, and even the deeper resources of their mines to profitable use, so that the very men who went forth in their youth to struggle with the savages and beasts of the distant wilderness might become the possessors of princely fortunes in their middle age. In earlier centuries it required generations to bring a people on a new

ground to a state where they could possess a fair share of the comforts of life.

Helpful as modern inventions have been to those who were subjugating this continent, the feat which our people have done in so swiftly bringing a great land to the conditions of civilization is the greatest which has ever been performed within anything like an equal time by any people. If the measure of their accomplishment in the interests of human advance had been limited to the fulfillment of this task, the Americans might still well be reckoned among the faithful servants of their race. No student of humanity, who has attained to a clear sense of the importance of these material foundations of culture, or who conceives the toil and pains required to attain them, is likely to underestimate the value and dignity of these deeds. It is, however, gratifying and stimulating to our ambition to know that our work has not been merely that made necessary by material conquests, but that our folk amid their other labors have found time and opportunity for other gains.

The greater part of the path-breaking which the American people have accomplished in the realms of thought and action, other than the purely material, have been in directions made necessary by their peculiar conditions. Their political and mechanical innovations have, as the naturalist would express it, been closely related to their environment. This assemblage of conditions has not hitherto permitted our people in any great measure to extend their labor into realms other than those of immediate need. They have been in the condition of an army engaged in a great conquest. There has been little time for meditation or for the development of those ideals which find a place only in a firm-set and completely ordered society. The greater number of the men of ability have commonly found themselves in the face of some difficulty of a practical kind which in their own interest or that of their fellow-men had to be immediately cared for. They lacked that store of resources which afford the material foundations of culture, the well-conditioned fields, the permanent buildings, the ways of communication, and the inherited wealth, which in other civilized countries has slowly been gathered by the labors of many generations. All these foundations of life they have had to construct for themselves. In nine tenths of the area which is occupied by our folk it has been necessary to do in one century the substantial work which in other lands has required more than twenty times that duration.

All the progress of our people has been shaped and controlled by the inherited traditions which they brought from the Old World. This accumulation of motives which determined the spirit of individual and associated action, and had been manifested in the morals, religion, and politics of this country, is the aggregation of experience, extending over thousands of years. About the best thing we can say of our society is that it has maintained and affirmed this precious store of inheritances which are embodied in the family, the churches, and the political organizations. They have cared for these invaluable seeds in such a manner that they have all greatly prospered on the new soil. First of all among these successful transplantations we must reckon the association of the family.

With the exception of a few abortive experiments which have had no influence on the general conduct of the people, the American family has remained in substantially the shape it has always had among the characteristic branches of the Aryan folk, among whom the household rests on monogamic marriage and on an organization devoted primarily to the care of offspring. Nevertheless, there are certain slight but important differences which are observable in the motives of the American family as compared with those of the Old World. The position of the wife is more important; she has a larger share in controlling its life, and a position of decidedly more independence, than in the Old World. In the greater part of our American States this independence has naturally led to more frequent divorces and in certain portions of this country the ease with which the marital bond is broken has brought about evil consequences. It is an open question, however, whether these ills are not a necessary attendant on the elevation in the dignity of women which we have secured, and it is more than possible that the purity of the family relation is helped rather than harmed by the ease with which unhappy marriages are dissolved.

The element of natural freedom which is so well marked in the position of American mothers is also indicated in the relation of the parents and children. The youth of this country have a measure of liberty which is generally unknown in European lands. There has clearly been a diminution in the authority of the parent, and in the obedience to it which the child renders. In general, the conduct of the American family rests more immediately upon the affections and the sympathies and less upon the formal traditions of conduct than in the Old World. The key to

this modification in the spirit of the household is probably to be found in the singular freedom which characterizes the choice of partners in marriage in this country. Beginning with liberty, and founded on affection rather than upon the economic considerations which dominate in the Old World, our households at the outset acquire another and on the whole a better spirit than that which prevailed among our ancestors, and which is maintained to this day in almost all European societies.

The essential absence of the aristocratic motive among our people has broken up in this country all the traditions of authoritative relation between separate households which are akin by descent. This relation of the gens is still a characteristic feature among the people who are above the grade of peasants in all the continental European states. In those countries, and to a certain extent in Great Britain as well, the separate families owe a certain allegiance to the head of their house—a more or less considerable magnate, who by virtue of seniority or station is supposed to have something of the chieftain's right of advice in matters concerning the gens. In certain parts of Europe a family council, which may represent many different households, exercises certain legal as well as social powers. All remnant of this ancient system has disappeared in the United States. Except so far as the relations between separate though kindred households is concerned, the bond is one of friendly sympathy, and the associations which are thus formed are more often dependent on mere friendship than on the ties of blood. An American rarely turns to the head of his house for direction or assistance; rarely, indeed, does he consider what man occupies that place.

It is a noteworthy fact that, although the old view as to the authority to be exercised by the head of a house has disappeared in this country, the interest of our people in family traditions appears to be greater than in the Old World. The historical and genealogical societies which, originating in New England, have spread rapidly over the country, afford evidence of this interest, and the literature of this subject which has come from the American press is singularly extensive. It is probable that the average American knows something of his ancestry for a much greater distance into the past than the European of a like social position. In other words, in place of the formal interest in matters pertaining to inheritance which in the Old World finds expression in the work of the colleges of heralds and like machinery for the authentication of succession from generation to generation,

and which pertains only to the affairs of people of estate and social position, the American interest in such matters rests more upon the natural bond of affection which should unite a man with his ancestors and his other kindred.

In the Old World, the man who is not by birth the member of a traditional family very often seeks to found a line by gaining wealth and station, with the hope of transmitting the goods to his descendants. Such ambition has but a small and diminishing place in the minds of American men. There are in the United States, fortunately, no titles which are handed on from one generation to another, and our social theory demands something like an equal distribution of a testator's property among his children, who are supposed to be equally dear to him; and this process of partition normally leads, in two or three generations, to the relative poverty of the descendants of a rich man. Hence it is that our men of fortune, in a measure unknown in other lands, seek to perpetuate their names by founding institutions of a learned or charitable nature, which they may fairly hope to have endure far beyond the term which any family can expect to have. In this way our society has won perhaps the greatest immediate profit which has come to it through the abandonment of aristocratic traditions.

What we may term, by borrowing a phrase from the students of Nature, the "organic intensity" of the American family, is well shown by the failures of the efforts to overthrow or modify its constitution which the social freedom of this country has permitted ill-advised people to essay. There have been four classes of these experiments within the limits of the United States, each representing a different theory of household life. First we may note the plan of an aggregate household, in which, though ordinary marriage was maintained, the work of life was done in a close community dwelling more or less under a common roof, and laboring under the direction of superiors. This system has been essayed at a number of different places, and the efforts have generally been made under the direction of high-minded and able men. Only two or three of these establishments subsist, and they are evidently doomed to speedy extinction. Their history makes it evident that the social and economic independence of the household is in importance like unto its monogamic foundation, and that the vigor of these units of our state can not be attained without the singular liberty which characterizes them among the people of our race, and nowhere else so well as in our own country.

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Another experiment with the family relation is that which was made by the Mormons. This society, probably the most peculiar which has ever existed among Europeans, reverted to the primitive savage institution of polygamy, and with it associated a measure of priestly control in the affairs of the household perhaps unequaled among people of civilized traditions. Although this experiment in the modification of the family which the Mormons have essayed was greatly favored by the singular fervor which so often characterizes a new religious sect, and also by the very unusual isolation which the folk secured in their asylum amid the Cordilleras, its failure is complete. The impossibility of the scheme is indeed acknowledged by the rulers of the sect, and with it ends all foreseeable danger arising from the destruction of the monogamic system among the people of our race.

Several unpleasant experiments have been made with socialistic establishments maintained without the institution of marriage, of which the most notorious was that at Oneida, N. Y. In this, the natural end of failure was attained swiftly, though without the direct interference of the law, and without any overwhelming pressure from the public opinion of the neighborhood. As in all such essays, where the people who undertake them have an earnest desire for the public good, the evils of any departure from the traditions of the race are soon made indisputably plain.

Last of all, we have to note the peculiar social system of the Shakers, the only communistic establishments in this country which have attained a high measure of economic success, and have secured a certain permanence in their organizations. The eminent peculiarity of these people rests upon the theory that the human species should be extinguished by the failure of its members to propagate their kind. They therefore have adopted the plan of absolute celibacy; and though their order is recruited from both men and women, the sexes are secluded from each other, each association being practically a combined monastery and nunnery, where the men and women share the labor of the great households and toil unendingly until they die. About fifty years ago the sect of the Shakers was very prosperous. They had colonies in a number of the then existing States of the Union; their societies were rich and commercially successful. There seemed, indeed, a possibility that they would become almost as important a feature in our American life as were the monastic institutions of the middle ages in that of Europe. Of late, how-

ever, the resort of discontented people to their institutions has diminished, and nearly, if not all, the societies are decreasing in numbers, and appear likely soon to pass away.

Of all the experiments with the household relations which have been instituted in this country, that made by the Shakers alone commends itself to the discreet lover of humanity. Here only has the departure from the customs of the family, established in the traditions of the race, been due to the spirit of self-sacrifice alone. From a moral point of view these societies are worthy of the highest praise. Their members have maintained an extraordinary purity of conduct, a trustworthiness in all their self-limited relations of life, and a dignity of behavior such as has rarely been found in any form of human associations. Their establishments afford a most desirable refuge for people whose relations in life have been unhappy, and it might well be hoped that these institutions would endure in our country until the need of such refuge as they afford had quite passed away.

The founders of our American state were mostly Protestants, a large part of them belonging to sects which had been subjected to considerable persecution ; many settlements of these first comers sought the land with a view of founding societies which were suited to their peculiar beliefs. Although a great part of the early colonists came to the country to obtain freedom for themselves in religious matters, none of them, except perhaps the Quakers of Penn's settlement, brought from the Old World the idea of religious liberty ; in fact, each colony after its kind in most cases showed quite as intolerant a spirit as that which it had been forced to flee from.

The singularly rapid growth of religious tolerance in this country, a feature which constitutes one of its most interesting characteristics, is not readily to be explained except as we reckon it to be due to the conditions which have made for freedom in general. Men acting as these pioneers did, individually and sturdily, against the physical difficulties which they encountered, naturally developed a larger measure of independence in all their thoughts and actions than was possible in the older society whence they came. Every sense of freedom is sympathetic, and leads the possessor to desire the like liberty for his fellow-man. The result was that within a century from the time the most religiously despotic colonies were founded, they came to endure, however much they might reprobate, the diversities of belief which grew up among them. In the second century of their spiritual develop-

ment there originated among our people a greater variety of sects than had ever been known in any other country. All these divisions of Protestants represented conscientious efforts to actualize Christianity, to bring the beliefs and modes of worship into accord with the conditions of life and with conceptions of duty. The greater part of these separate churches represent views of the Christian doctrine which originated in Europe in the earlier history of the Church, but which were more or less completely repressed by clerical authority, backed by the powers of the state. The complete separation of the state from the Church in this country permitted all these latent differences of opinion to find a free expression. The result of this conflict of opinion appears on the whole to have been educative in its effects. It has cleared away from our society some of the ancient and firmly rooted prejudices which rested upon an adherence to highly formalized religions. Those who are led by their thinking to depart from an ancestral faith are no longer made to suffer in mind, body, or estate, as in the olden time.

It is interesting and suggestive that the frontier districts of this country have shown a greater tendency to religious independence than the longer settled regions. This feature is doubtless due to the fact that the people of the border are, by their conditions, made freer from the influences of tradition than those who dwell in the well-framed societies. Wherever these divisions of American Protestants may have originated, they characteristically exhibit a singular vitality. None of them which have ever been really founded have ceased to exist. In part their endurance is doubtless due to the fact that their creeds and customs meet the needs of minds of a certain order, but in a measure their survival is owing to the large share of wealth which they have commanded for their maintenance. It has been, indeed, characteristic of the American people that they have ever given freely of their substance for the support of their religious ideals.

One of the most peculiar elements of strength among the American sects of Protestants is attained through their relations to the schools. It is true that since the earlier stages in our educational development the primary and intermediate teaching has generally been in the control of the state, and has thus been kept quite separate from sectarian influence; but each of the many divisions of Protestants in this country has, from the time of its birth, and generally successfully, endeavored to found and maintain institutions of higher education, academies, colleges, or

universities, which would insure the education of youth in their faith. In this way, by providing for an educated ministry and for the culture of a part of their laymen, they have done much to insure the dignity and perpetuity of their churches.

It is interesting to note that alongside of the diversities indicated by the numerous religious sects of this country, we find great bodies of the population where the people have devotedly adhered to their ancestral faiths. The early establishments of the English Church along the Atlantic border have retained their vitality and sent forth a multitude of establishments into the newer parts of the country. The British Catholics of Maryland and the Lutherans of Pennsylvania have remained unchanged, and have done a notable though less extensive colonizing work. The present tendency in this country appears to be toward the sympathetic contact of all the divisions of the Christian faith. The old dislikes based upon sectarian prejudices are clearly disappearing, and the disposition is to regard the sect of the neighbor as a mere individual expression of a vital belief common to all who profess and call themselves Christians. Thus, while at first sectarianism seemed likely to breed serious dissensions in this country, it now may fairly be asked whether the eventual result will not be to bring about a truer because more rational union than any which could have existed under the system of authority.

In noting the peaceable conquests of this country, we must not lose sight of the missionary work which its Protestant Christian denominations have accomplished in many lands. As the early colonists were themselves the products of the evangelizing motive, it is not surprising to find the same spirit exhibited by their descendants, and that from a very early time much good has been done in this country by the missionaries who have gone forth from it to other lands. For nearly two hundred years after the English settlements were founded, the propagation of the gospel in foreign parts, so far as it was carried on by our people, was either unorganized or under the control of foreign boards. It was not until 1810 that the American Board of Missions was founded. Shortly afterward came the American Presbyterian Board, and the Baptists organized their Burmese Mission in 1813. The Methodists set about their work in 1819.

At present there are about thirty organizations in this country which maintain evangelizing work. The number of their missionaries is about 3,000, and their aggregate annual revenue over $5,000,000. The Protestant missionary enterprises of this country

are only exceeded by those of Great Britain, which in amount of income and number of agents are but little greater than our own. It is a noteworthy fact that the American Protestant missions are, as measured by their resources in the way of men and money, about five times as strong as those from all the states of continental Europe. In fact, it is to the English-speaking peoples that the dissemination of Protestantism during the last century has been due.

We now turn to the consideration of certain of the more important motives which have, by determining the interactions of men, served to control the development of this country. It scarcely need be said that all these mainsprings of human action have been inherited from the Old World. The only local peculiarities which are traceable in them are found in their relative strength and in their modes of manifestation. Some of these variations are of lasting importance and deserve close attention. First of all we note that American life tends to promote a quick understanding between men, which naturally leads to an enlargement and intensification of their sympathies. Nothing so favors the ready understanding of one man with another as the task of sharing in the duties of a government which is imposed by democratic conditions. In such relations each citizen is naturally led to comprehend his neighbor's state of mind; he is forced to conceive the basis of action of those to whom he has intrusted the duties of the State. He has to be socially alive in a way which is not required of the man who submits to a superior authority in whose action he has no share. Therefore it is not surprising that among the greatest though also among the most intangible characteristics of our people—a feature which generally escapes the attention of foreigners and is mostly unperceived by ourselves—we have to reckon the quick and tolerably far-reaching insight of the American into the motives which guide the conduct of his fellow-citizens. It is this great though almost insensible work which is the foundation of those educative influences which directly arise from the constitution of a true republic.

All understanding which men gain of each other naturally leads to the broadening of those sympathies which afford the basis of all higher spiritual development. Therefore it is that our political methods have served to bring our people into a remarkably close sympathetic understanding with each other. Those who would see how strong is the bond of brotherhood among the citizens of this country, at least among those who mutually recog-

nize each other as Americans, should study something of the details of the contacts between the armies of the North and South during the great rebellion. All war is brutal, and internecine strife has in most countries been peculiarly bitter and cruel; but when we examine the records of our own great contest we are struck by the fact that, notwithstanding the many unhappy instances of needless suffering, the woes were more mitigated by the sympathetic relations of the combatants than ever before in the history of such a struggle. Even in the heat of combat prisoners were generally well treated and the enemy's wounded cared for. Noncombatants suffered, as is inevitable in war, but the instances of sheer brutality were rare, and were apt to be as swiftly avenged by those who were on the side of the offender as they would have been on the part of those who were his enemies. The essentially fraternal feeling is shown by the fact that at the end of the war the actual combatants on the two sides were really more nearly in sympathy than before the strife. Their grim meetings on the field of battle had led to the mutual understanding which is the real basis of all cordial relations. It showed them that they were alike in valor, in obedience to the dictates of conscience, in the motives of self-sacrifice to the obligations of duty, and the result was the birth of a curious and abiding affection between the men who had been seeking each other's lives.

Other and equally clear evidence as to the intensity of the sympathetic motives is shown by the quickness with which every appeal for help made necessary by calamity stirs the hearts of the people throughout the land. This was evident in the closing stages of the civil war, where the parts of the North which were most intensely excited against the people in the Southern portion of the country hastened to aid the folk who had been reduced to poverty by its hardships. To take but a single instance, when the city of Savannah surrendered after the brief siege by Sherman's army, the people there were in a condition of utter destitution. Spontaneously, and with no thought as to the quality of the action, ships were laden with needed stores which were sent as a gift to the unhappy people. Immediately after the close of the struggle many of the Southern leaders reappeared as representatives in Congress, and the man who had been Vice-President of the Confederacy was treated with singular consideration by his associates in the House of Representatives. Never before in the history of civil wars has anything like this hearty fraternization of victor and vanquished attended the close of the contest.

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In those unhappy instances where pestilences such as yellow fever or other plagues have visited and ravaged parts of this country, there have never been found wanting men who were ready to give their personal aid in caring for the afflicted. Trials of this nature afford the best possible proof as to the state of men's minds in relation to one another, and the results seem to indicate that in all important regards the sympathetic motives of our folk have gained from their experience under our institutions. It is difficult to exaggerate the importance of this fact, for on it, to a great extent, depends the maintenance and advancement of our society.

Although individual activity, which is so characteristic a feature in American life, has served to quicken the sympathetic understandings of the people, the trend of the development which has thus been brought about has differed much in various parts of the country. Thus, in the slaveholding States, so long as slavery continued, the effect of the institution was to create a very clearly defined aristocratic class, and so for a time to maintain or even to recreate a mediæval state of society. In such a social organization the social tendencies differ totally from those which characterize a true democracy. In the aristocratic state the sympathies are somewhat arbitrarily limited by considerations of station. The sense of a common humanity which is at the foundation of a true republic can not be adequately strong in a social system where men are parted from each other by barriers of privilege. It must be confessed that something of this element of privilege is retained in the most perfect democracy which is consistent with a highly organized society, where the wealth, the education, and the occupations of the people greatly differ; but, while in a democratic state these divisions are transitory and subject to revision with each change in the circumstances of the people who are affected by them, in the aristocratic state they become matters of inheritance, and therefore are of vastly greater importance. So long as slavery subsisted the tendency of that institution was inevitably to divert, and indeed to turn back, the path of the population from the high ideals which a truly democratic society seeks to attain. If slavery had been maintained in this country, the result would have been the institution of an oligarchy in all the realm which it occupied. Although there are other influences which tend to give undue power to wealth in this and other lands, there are none which so perfectly accomplish the result as the possession of slaves; none which are so safe from the

influences which normally serve to maintain the spirit of democratic institutions.

With the disappearance of slavery the greatest barrier to the advancement of democratic institutions in this country was broken down. There still remain, however, two dangers to face, each of which may well give thoughtful Americans subjects for troubled inquiry. The first and most difficult of these concerns the social and political position of the African element of our population. As the people belong to an utterly alien race, as remote as possible from the Aryan in their physical aspect, they have unhappily to encounter the curious instinctive prejudice which separates the varieties of men from each other in the same manner as they part kindred species of animals which rarely dwell together in amity. Thus, even if these African folk had come to us on the free ways of immigration, it would be difficult to see in what manner the development of caste distinctions due to their presence could have been avoided. The solution of the problem is the harder for the reason that these people have long been slaves, and in the countries which alone are fit for them they have to enter into relations with a dominant class, once their masters. There is now little reason to fear that the relation between the whites and blacks in the greater part of this country is to be other than amicable. It must be said that this assurance is due in good measure to the fact that the negro is an extraordinarily sympathetic creature, and usually catches the tone of those who shape the society in which he dwells in a very remarkable and effective manner. He seems to be the only primitive man endowed with the capacity of attaining a ready outward adjustment to the manners and customs of the Aryans.

The statistics of the last census appear to indicate that the negroes are not likely hereafter to increase as rapidly as the whites. It seems not improbable that in time their numbers will only bear an inconsiderable proportion to that of the whites, except in a small part of this country to the east of Texas and south of Virginia, and that in this section they will be in the main limited to the lowlands near the shore. Thus relatively reduced in numbers, their essentially foreign quality may no longer have a menacing effect upon our institutions. Much also is to be hoped from their education. Although we are accustomed to assemble all the blacks in one class, they really are, as regards their original character, much more diversified than the whites of this country. There are many strains of blood among the negroes characterized by

decided capacity for the duties which fall to the lot of the American citizen. These people will make for themselves a place and enter into a citizenly sympathy with the whites, while the mass of the population will, while it survives with us, necessarily remain as an inferior caste, imperfectly provided with the motives which are necessary in men who are to take part in the functions of a democratic government. At best, the presence of these Africans menaces the unity of our people; we can only hope in the course of time to minimize the evil.

Dangers similar to those which are brought about by the presence of Africans in this country arise from the immigration of Europeans from those states where the mass of the population has never had a chance to acquire the traditions of freedom and responsibility which are the foundations of true citizenship. So far as these people come to us from Great Britain, Scandinavia, and Germany, experience shows that little or no perturbation of our society is likely to arise from their presence among us. Their inherited motives and traditions are sufficiently akin to our own to make it certain that, in one or two generations at most, their descendants may become entirely fit for the duties which our life imposes upon them. It is otherwise with the immigrants who come to us from eastern and southern Europe, and who are from states whose history has been so different from our own that the people have had no chance to acquire the qualities which are needed by our American people. In many of these peripheral parts of Europe the laboring population is to a great extent derived from races other than the Aryan, and the folk therefore lack the ancestral foundation which affords the basis of our civilization. Many of these immigrants are as permanently foreign to our institutions as are the Africans; and though they are prevailingly of more ability, and are not separated from us by strong physical marks, they, for some generations at least, constitute a distinct danger to the state. All that we know concerning the laws of inheritance leads us to believe that the descendants of these people are likely ever to remain laggards in the way of progress. Except so far as their peculiarities disappear through the commingling of their blood with that of the population which constitutes the state-shaping class in this country, they must remain in a measure foreign to our motives.

The course which we are to take with reference to the incursion of these peoples, who are so radically foreign that we can not hope to Americanize them, is perhaps the gravest problem which

our nation has now to face. It is the more difficult to attack for the reason that action seems impossible without doing some wrong. On the one hand, to admit them without reservation and in such numbers as their own needs may determine, will be to sacrifice the heritage of our children to our momentary convenience, much in the manner of our ancestors who introduced the African slaves; on the other hand, to debar these people from a refuge in their extremity, from an asylum which affords a chance of relief for themselves and their posterity, is a severe act, and one which can only be justified by a most evident duty to our successors in the state. It will be most interesting to note how far the wisdom of our commonwealth suffices for the needs of this grave adjudication. At present it seems likely that our authorities will take a tentative course, upon the first steps of which they have already entered. This course is likely to lead them to make some requirement in the way of education and sound bodily condition in the case of those who desire to enter our gates. Such action is the more justifiable for the reason that the ever-increasing ease and cheapness of transportation provides a practicable way to many lands besides our own for the people of Europe who seek only bodily comfort. Vast territories in northern Africa which were once extremely fertile, but which for political reasons went out of cultivation, are now open to the poor of the Old World, and yet more extensive regions in South America are now cheaply accessible from European ports.

Although the people of this country have ever been disposed to follow the advice of Washington—to avoid the dangers which may arise from entangling alliances and complications with foreign powers—they have on many occasions shown a quite sufficient willingness to maintain the rights of their citizens in other countries. They were the first effectively to check the ravages of the Tripoli pirates, who for centuries had preyed upon the commerce of the great European states. In 1801–1805 our navy, under Commodore Stephen Decatur, chastised that people, and obtained a promise that the flag of the United States should be inviolable. Again, in 1815, the same officer repeated the lesson which had been given to these marauders, and made an end of the depredations upon our vessels. On many other occasions our Government has shown the same willingness to take a share in repressing the ills which barbarous communities have inflicted on commerce. The Koszta incident, where an American commander enforced the surrender of a naturalized citizen, born in Austria,

who had been unjustly imprisoned on a man-of-war of that country; and the attack on Corea, undertaken to avenge the massacre of a shipwrecked crew belonging to an American vessel, may be cited as incidents to show that our country has been willing to maintain the safety of its citizens at the peril of war.

On many accounts the most interesting as well as the most characteristic event in our foreign history was the opening of the Japanese ports by Commodore Perry. For more than two centuries the people of Japan had held themselves strictly secluded from the outer world. The Christian missionaries had been driven away and their converts compelled to desert their faith. So absolute was the interdict of communication with other peoples that the shipwrecked sailors of Japan were refused permission to re-enter their country. In 1853 Perry sailed into the harbor of Urago. Without actual violence, yet it must be confessed by the threat of it, a treaty was signed. The privileges given by this covenant were gradually extended to other countries, until the empire became a part of the active world.

It is interesting to note that this conquest of Japan led to no territorial gains. It would doubtless have been easy for our Government to have imposed the relations of a protectorate upon the country, or at least to have secured the exclusive right to use and garrison one or more of its ports. If such projects were even thought of, they certainly were not entertained; the course of our authorities was throughout large-minded and disinterested; it affords, indeed, a remarkable contrast to that of the other great powers in their dealings with Oriental peoples.

It is doubtful if any of the many interferences of the civilized powers in the affairs of Asiatic countries has proved so fruitful in important consequences as this of our country in Japan. Beginning with the treaty of 1854, the Japanese Empire has undergone a remarkable series of political and social revolutions which have led the folk rapidly toward the semblance of Western life. At the same time the diffusion of their admirable art products has had a notable effect on the æsthetic spirit of Europe and of other lands. The full effect of these changes is not yet clearly to be seen, but their importance in the affairs of the world is unquestionable.

In considering the reactions of our own country on others, notice should be taken of the many sympathetic movements which have agitated this land when foreign peoples have been endeavoring to secure their freedom. The efforts of the Greeks to escape from the Turkish thralldom; of the South American states to or-

ganize governments akin to our own; of the Hungarians to rid themselves of the Austrian yoke—each in their turn have awakened a singular interest in America. These movements show at once the confidence of our countrymen in the goodness of their own Government, and how keen is their sympathy with those who suffer from oppression. The welcome given to the exiled Kossuth in 1851 was a remarkable exhibition of this sympathetic motive. His journey in the United States was the greatest triumph which has ever been accorded to a foreigner, except perhaps that which Lafayette received on his second visit to the United States.

There is a curious exception to this sympathetic outgoing of our folk toward distressed peoples. This is to be noted in the history of the French Revolution. That revolt was at first warmly welcomed by our people, who had been drawn into friendly relations with France by the events of the war between the colonies and the mother country. The Americans might indeed claim to have sent the torch of freedom to their Gallic allies. The brutal conduct of the revolutionists, however, swiftly checked this approval, and led to a general condemnation of the movement. The efforts of the French to enforce the preposterous treaty made during the war with England, which required the United States to act as their ally in all future struggles, led to strife between the republics, and to an exasperating conflict which at one time threatened to be serious. This accounts for the single case where our people have not in spirit been with those of Europe who were seeking liberty.

In certain features of its foreign relations the United States has remained in striking contrast with all the other great states of the world. In no case has it in a large way entered into international politics, and it has been associated with European powers only in a few minor difficulties with barbarians, as in the Samoa incident. Moreover, with the land hunger which is natural to all the peoples of our race, and which our Government has abundantly exhibited on this continent, we have avoided the acquisition of territory in other parts of the world. From time to time the spirit of conquest appears in our politics, or is manifested in "filibustering" expeditions, but with one exception it has been fruitless. At the close of the civil war, when our people were moved by the wild ambitions which were naturally developed in such a struggle, and while the dangers of foreign intervention in the affairs of this continent were made plain by the effort to estab-

lish a French protectorate in Mexico, endeavors were made to acquire outlying territories both to the north and south of this country. The Federal Government turned covetous eyes on Santo Domingo, Greenland, Alaska, and even Iceland. Of these wastes of the north only one was obtained—Alaska—which was purchased from Russia. This province is, and bids fair to remain, a valueless and dangerous possession. It is a vexing element in the business of the Federal Government; it has, through the question of the seal fisheries, proved itself a danger in our foreign relations; and may, in case of war, tax our energies for its defense. Its protection will, in such an event, demand a fleet which it may be difficult to spare from more important duties.

We see the effect of these wholesome views concerning foreign possessions which our people have generally entertained, in the discussion of this day concerning the annexation of Hawaii. The temptation to acquire that tropical archipelago, due to its fertility and to its commanding position in the great ocean, was so great that in the enthusiasm of the moment the annexation was very near being accomplished. Fortunately, time was given for deliberate consideration of the project, and on second thought the representatives of the people turned from that dangerous way.

It is evident that our people understand at once the strength and weakness of their political and military position in the world well enough to see that their Government is not such as will safely permit the acquisition of colonies. There is no place under the Constitution for such possessions. Moreover, their protection would demand the establishment of a permanent army and navy strong enough to cope with the military power which a European coalition could bring against us.

We now turn from the political activities of our people to consider those divisions of their labor which pertain to the industries which they have successfully pursued. Among all peoples who are elevated above the careless savage state, the industrial activities, if closely scrutinized, afford one of the best possible clues to the existing state of a folk. Systems of government, the social states—even the moral and religious quality of the population—are to a great extent hereditary, and are bound up with motives which effectively resist change. Although the arts are in a measure traditional, the element of competition comes in to enforce advancement in a degree unknown in other branches of activity. From them we may ascertain something of the invent-

iveness of people—of the readiness with which they adapt themselves to the needs of their environment. Furthermore, these occupations, inasmuch as they shape the characters of men, react upon the social state as well as upon their political motives.

First among the industries of any great country we must reckon those which pertain to agriculture. We shall therefore first glance at the conditions of this art. In most countries the agricultural arts are subjected to but little alteration. The Italian of to-day turns the ground with a wooden plow which might have been shaped in a Roman workshop. The methods of tillage in most European countries have changed but little in the course of centuries. In this country, on the other hand, the processes and appliances of agriculture, except in remote and inaccessible districts, have been subjected to rapid and important modifications. Perhaps the most important of these changes in the industries of the farm consists in the limitation in the variety of work carried on in these rural establishments. Of old, nearly all the articles which entered into the family life of an agriculturist were made in the household. Cloth of various kinds, candles, soap, the greater part of the tools, even the worked timber used in the edifices, were of domestic manufacture. This is no longer the case in those parts of the country which have been subjected to modernizing influences. The ever progressive division of labor, and the rapid extension of commerce made possible by improvements in the methods of transportation, have led to the removal of many industries from the farm to the factory, where, by the use of machinery and trained labor, many articles can be made more cheaply and perfectly than under the domestic roof. In this way the spinning wheel and the loom, the lye vat and the dye tub have ceased to be a part of the farmer's possessions. This change is not altogether fortunate, for it has served to diminish the range of the farmer's occupations, and thus to limit the educative influence of his employment. At the same time it has made him less independent of the commercial world than his forefathers were.

Coincident with the abandonment of varied household industries in the farmstead has come about a like giving up of the varied tillage which was customary half a century ago, when it was the habit of each proprietor to plant a great variety of crops, and to mingle to a greater or less extent the rearing of cattle, sheep, and horses with the work of the plow. Thus the fields of our grandfathers often yielded a score or more of products, and their revenues were from as many different sources. Of late the

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tendency has been to convert our plantations into factories, each of which yields sometimes only one article which is intended for sale. The advantage of this system is that by care to a single product the proprietor can in most cases produce it of a higher grade of excellence and with less trouble to himself or his family; but the advantage is bought at a tolerably dear cost, for the revenue of the establishment then depends upon accidents of production and the ever-changing price of a single commodity. Moreover, the effect arising from the plan of rearing but one commercial product is to destroy the variety of occupation which of old made agricultural work highly educative.

The ease with which large bodies of land on the Western prairies were acquired has led to the institution in this country of vast farms managed by a single head, the like of which have never been known in other lands. These domains are generally appropriated to single industries, such as rearing cattle or small grain. These great establishments have proved economically very successful, and they appear to point the way to a gradual alteration in our agricultural system whereby our small, independent farms, each tilled by and supporting a single household, will give place to great plantations controlled by capitalists and conducted in much the same manner as mills and factories. No one who attentively considers the course of our modern economic arts can well doubt the conclusion that this tendency toward consolidation which is manifested in all our industries must be extended to the work of the fields. We may hope, however, that the unification of labor may be brought about by the co-operation of the laborers, and not through the machinery of invested capital, acting through ordinary corporations.

On the whole, American agriculture has shown a greater flexibility as to methods than this art has exhibited in any other country; except in the regions formerly occupied by the institution of slavery, a high measure of inventiveness has been shown in the quickness with which the people have changed their methods of cropping to meet the exigencies of the commercial conditions, as well as by the ample range of contrivances which have been adopted in the various departments of work, many of which have been the product of the farmer's intelligence. From the beginning this class of our population has taken a keen interest in all matters pertaining to the state. They have exhibited a political sagacity and a patriotism which have been of incalculable value in all our national crises.

The qualities of the American character are indicated in the search for underground wealth almost as clearly as in agriculture. Although the mining industries of this country were slow to develop, not attaining to any great importance until near the beginning of the second half of this century, the progress in the art has been singularly rapid, until at the present day the total production of the mines is greater than that of any other country, and the variety of products incomparably great. The range and scope of the mechanical contrivances for use in mining which have been invented in this country since the middle of the century are remarkable. They include a greater variety of such appliances than within the same time have been devised in all the other countries taken together.

Although the earth products yielded by the farm and mine are in this, as in all other well-conditioned countries, the basis of the economic life of the people, the development of our civilization has led to a vast growth in manufacturing industries. Up to the time of the Revolution these mechanical employments had not claimed a relatively large share of attention. The manufacturing which was done was almost limited to the work of the households; the greater part of the factory products came to the land from the mother country. The enforced isolation brought about by the Revolutionary War served in a way to compel the people to rely upon themselves for all the necessities which the mechanic arts afford. From that time to the present day they have step by step become more independent of other lands, and have taken a larger share in supplying the markets of the world with the products of technical labor.

During the first half of this century the development of manufacturing industries went forward rapidly, but the field of growth was essentially limited to the northeastern portion of the United States. The first factory towns grew up in this region for the reason that the capital required for their industries was to be found only in those parts of the country where it had been won mainly by seafaring commerce. In purely agricultural districts, however great the prosperity, the people rarely have sufficient wealth to embark in large manufacturing enterprises. Something also has to be attributed to the fact that only in New England and the neighboring portions of New York do we find very many streams which conveniently afford good water powers, such as were required by mills in the days before the coal deposits of the country had been made accessible, and when the steam engine

was still a costly contrivance, consuming for the power it yielded several times as much fuel as it does at present.

As the wealth of the country has increased, the mechanical industries favored by the abundance of fuel have spread to the westward and southward, until almost all the land to the east of the Mississippi abounds in varied manufacturing establishments. It is now evident that our country is to exhibit the type of economic organization where a wide range of arts will be found in almost all its parts. In this feature it will be unlike the Old World, where the various mechanical industries have become segregated to particular fields. This intermixture of employments promises to be advantageous in many ways. It will serve to prevent the excessive diversification of our people by sections, and it will in a measure relieve the population of the tax which distant commerce in all cases imposes. These questions have been amply treated in the chapters which pertain to commerce and transportation.

It may be observed that the commercial success of this country, by the high price of labor which it has brought about, has in a measure served to limit our foreign commerce in those products into the value of which labor largely enters. To this is doubtless due the fact that our great stores of coal and iron have as yet served almost altogether for domestic use. As long as vast areas of virgin soil easily won to tillage and without rental value existed, it was natural that our principal exports should consist of food products, or in other materials abundantly yielded by the soil and under earth, which could not readily be obtained in other countries, such as timber and petroleum. It is true that in certain manufacturing industries, where the great skill and efficiency of our workmen have served to make their products of peculiar value, we have found a profit in export trade. As yet, however, the most important of our mineral stores are shut out from general commerce by the cost of production. It seems certain that before long there is to be a readjustment in the rate of wages which will bring our earth resources into the currents of the world's trade. There is reason, however, to hope that this change will not reduce the wage earners to the level of their brethren in Europe. The cheapness of food supplies in this country, the greater laboring value of the American workman, and the increase in the mechanical contrivances used in mining and smelting ores, are all likely to lower the cost of production without correspondingly decreasing the price of labor. It is evident the feature in our American economic life which departs the most

from the ancestral type is found in the inventive spirit of the people and the intelligent way in which they labor.

Perhaps the most distinguishing mark of our modern culture is to be found in the vastly increased share in skill and care which is given to the prevention and cure of disease, not only of man, but among his companions, the domesticated animals. In this great work our country has followed on the paths laid down in the Old World, and has made creditable additions to the common store of endeavor and experience. In matters pertaining to the prevention of disease it must be confessed that the United States still lags behind the better managed states of Europe. This defect is particularly noticeable in our smaller towns and rural communities. In such places, even more than in the cities, there is grave need of knowledge concerning matters pertaining to public health.

It is now recognized that the out-of-door sports of a people constitute one of the most characteristic elements in their life. The great difference between the Greek and Roman civilization could have been inferred by an observer who saw nothing but their public amusements. So, in this day, much of the difference between the motives of the continental European is indicated by the games and contests which attract their citizens. We readily note that in this country the diversions of their people attest their close relation with the mother land. With the exception of cricket, which has never taken a firm hold in the United States, most forms of outdoor diversion which originated in Britain have been maintained, and only one—that known as lacrosse, which was adopted from the Indians—is in any way peculiar to North America.

The leading diversions of the open air—yachting, horsemanship, and sharpshooting—have not only been retained in our habits, but have been more successfully pursued than in the Old World. The latter two owe their distinguished position in part to the fact that the horse and the rifle have been not only means of amusement but needful to our frontiersmen. In yachting the motive has been that of sport alone, yet the success in this field has been distinguished and singularly continuous.

In this country, as in England, the advance of the humane spirit is shown in the steady decay of those sports which are of distinctly brutal nature. These are not only forbidden by law; they have been banished by the consent of all true sportsmen. It is hardly too much to say that field sports which take the form

of athletic contests have proved, on the whole, more attractive to the American people than to any other equally large population. It is therefore agreeable to note the fact that this interest indicates a capacity for keen sympathy with the endeavors of others, such as we may expect in a society where the motives demanded in good human relations are well developed.

Owing to their isolated position and to the plan of their Government, the people of the United States have in the century or more of their existence as a nation been exempt from foreign wars: except the two which they have waged with the mother country and that with Mexico they have been spared such ills. The small conflicts with various petty foreign powers, in which the navy alone has taken a part, may be regarded as of no great importance. Owing, however, to the continued struggle with the Indians, and to the great conflict of the rebellion, this country has been in fact one of the most belligerent states in the world. In the number of its campaigns it is exceeded by Great Britain, but in the expenditure of blood and treasure it stands alone among the peoples of its time. It is, however, characteristic of our people that they have never become a military nation. Duties of this nature have always been on the whole distasteful to them; they have patriotically and energetically met every demand which has been made upon their fighting power, but they have ever been unwilling to maintain great bodies of soldiers or fleets of war ships, or even to provide the harbor defenses and other strongholds after the manner of the Old World states. Undeclaredly they have held that military service, beyond the limits of the small force required for police duty on the land and seas, was an undesirable occupation for the citizen, and an unrequired expense for the nation to bear.

What we may term the citizenly view of war characterizes the American soldier when he is enlisted in campaigning. To meet the exigencies of great conflicts, it has been the custom in this country to assemble volunteers—men without any previous training in the duties of the soldier. When first brought into the service these troops have proved difficult to manage, and in a military sense untrustworthy. In a short time, however, they become subjected to discipline; the experience of the civil war seems to have shown that they attain the state of veterans with less actual service than is required in the case of European troops. At the best, however, our American volunteers still retain an independent motive which is in sharp contrast with the mechanical spirit that

pervades European armies. The men are disposed to criticise their officers much as they would the moderators of a town meeting. They obey authority, not blindly, but because they feel that it is a necessary element of the work in which they are engaged.

The independence of spirit which the American maintains, however subjected to the stern discipline of an army, has proved helpful rather than harmful to the success of our troops. It enables the men to act with individual judgment in many crises which would surely bring disaster to forces which had a more truly military character. Thus, in the battle of Gettysburg, when Pickett's charge broke the Federal line, and when for the moment, owing to the death of many officers, the succession of command was lost, it is said that the men without orders took up positions which enabled them quickly to crush the invading column. Throughout the rebellion the commanders of both Federal and Confederate armies found that they could trust their subordinate commanders, or even the individual men, to exercise a sound judgment, and to act with vigor in the unexpected situations which the struggle developed. During the first stages of that war the troops on both sides showed the tendency to be affected by panics which is common to all militia. It is remarkable, however, how quickly these stampedes ceased to occur. The men soon learned to meet calamity, or even continuous disaster, with a patience and an endurance of spirit rare in other armies.

Perhaps the most suggestive feature exhibited during the conflict of the rebellion was the confidence which the soldiers maintained in their officers of all grades. They were, it is true, unendingly critical of those put over them, yet for all that they believed in their commanders. Those who have memories concerning the behavior of our troops on the march or in action will recall the continuous comment of the common soldier concerning the conduct of the campaigns. To any one accustomed to the armies of the Old World it must have seemed as if our forces were ever about to melt away in mutiny. Through it all, however, there was scarcely a trace of such action. Every man felt that those set over him were probably trying to do their best; the common soldier could put himself in the place of his officer and appreciate the difficulties which he had to meet.

It is a singular feature in our American armies that treachery, like mutiny, has been almost unknown. During the civil war, when, owing to the mixture of motives which actuated men, a great deal in the way of desertion from one side or the

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Academy of Art, and Art Museum, Cincinnati.

other might have been expected, such betrayals rarely occurred. Even in the times of sorest trial no commands went over from one side to the other; the writer has been unable to find a single instance where an officer of high grade appears to have proved treasonable to his cause. Even in the closing days of the war, when the Confederate forces were in hopeless extremity, their forces held and acted together with admirable good faith.

Although the most characteristic education to which our people have been subjected is that which has come from the peculiar conditions of their life work, we must note the advance which has been made in the educative work which is accomplished in the regular schools. While it is not, as is generally supposed, true that popular education, the system which rests on the theory that every citizen should be schooled, was first developed in this country, it is the fact that such a system attained an extended growth in portions of America at an earlier time than in any other great land. The interest in such training at first differed very much in the several European settlements. For reasons which it is not necessary here to note, the dissenting colonies, those of New England in particular, brought with them an educational motive which was much more advanced than that of the people who occupied the other settlements. Thus it came about that the first general efforts to educate the members of all the social ranks were made in the New England district. Gradually, however, by the dissemination of the New England motive, and by a growth of the conviction that the American citizen must be informed before he is fit for the trusts which have to be imposed upon him, the ideal of popular education has been diffused throughout the country.

The most peculiar feature in our American education is found in the foundation of institutions which have for their ideal the development of liberal culture. Owing to the fact that many of the leaders in most of the American colonies were men of education, and owed their station in their several societies to the training which they had acquired, we find almost everywhere in these cradles of our population that there was a curious desire to found colleges. We perceive this motive first in the founding of Harvard College, which was established almost as soon as the colony of Massachusetts Bay had built shelters for their households, and cleared enough land to afford them food. In quick succession each of the considerable colonies—Virginia, Connecticut, and New Jersey—entered on the same way. The motive endured; it in time became characteristic of all our people. What-

ever the stress of their circumstances, they built colleges and sought to found universities. Thus when our people first broke into the Ohio Valley, and occupied the fields of Kentucky, the pioneers, many of whom had had some schooling in the William and Mary College, set up a good school even before they had assured their possessions from the hands of the Indians. This establishment, fitly called Transylvania, in allusion to the fact that it was placed beyond the unbroken forests of the Alleghanies, was developed by the loving care of a people while they were engaged in as strenuous combats with the wilderness and its savages that has ever fallen to the lot of man.

The most notable feature in the recent development of education in this country is found in the rapid increase of technical schools. It is to be regretted, however, that the greater part of these have been established under conditions which tend to dissociate their education from that which pertains to liberal culture. In the plan of these establishments, the founders have unfortunately and in a somewhat servile manner copied the plan of similar institutions in the Old World. Owing to the aristocratic conditions of Europe, it was determined, when the need of education in the technical arts compelled the institution of schools devoted to their interests, that these establishments should not find a place in the seat of liberal culture. The clergyman, the lawyer, the physician, and the man who sought the advantages of a university as a fitting element in a preparation for a life of leisure, could not abide the notion of bringing men engaged in mechanical employments into the universities, which had long been the seats of what they believed to be a much nobler training. Hence the technical schools of Europe had to find a place apart from the ancient universities. When we of this country came to found such establishments, they were likewise in most cases separated from our colleges.

Owing to the fact that nearly all our technical schools have been recently founded, and have not yet in any considerable measure begun to influence the culture of the country, little attention has been paid to the consequences which may result from this un-American separation of our higher education into two fields—the one esteemed liberal and enlarging, and the other regarded as pertaining to the lower walks of life. It seems to the writer, however, that there can be no question as to the eventual effects of this system. It will tend to deprive the educated artisan of those influences in the way of enlargement which are afforded

by the opportunities of study and association that can only exist in a true university—a seat where able men present, to those who will hear, something of all learning, and where, by contact with their teachers, the youth acquires a sense of the fullness of knowledge. In this country, where the very foundation of our life is in the theory of like opportunity for all men, it seems to be a mistake of a pernicious sort to follow the aristocratic traditions of the Old World, by separating the education designed for those engaged in the higher technical pursuits from that contrived for the man who is to follow the ancient professions. It is clear that education and the culture which comes from it are the common field of democracy. In it our people are to find the one chance to develop the motives of unity which may make head against the caste-giving influences which inevitably arise in every old society. This unification can not be sufficiently effected in our elementary education. Already we perceive a great disposition on the part of our wealthier classes to train their children in private schools and academies which are not much resorted to by the body of our people. If now our higher education is to be so arranged that the men of different pursuits do not meet on a common ground, we shall cast away one of the best opportunities of doing an educational work such as our country needs.

In one of the resources of higher education our people have made great progress. They have developed public libraries, or those connected with institutions of learning, in great numbers, and have managed them with admirable system. It is true that we have in America no collections of books which are as extensive as half a dozen of the largest collections in Europe; those assemblages, however, are the results of centuries of expenditure and opportunity; most of them have had the support of national revenues. In America, or at least within the United States, the ideal of the librarians has been to bring together the books which would best serve for the use of the class of people which has access to them, and to organize the methods of cataloguing so that the stores might be most readily accessible. In these tasks they have been so successful that we already have more useful and more numerous libraries than any country in Europe.

The results of the formal education of any country are well indicated by the success of the men engaged in professional life. Judged by this test, our American training schools which seek to fit men for professional work of various grades must be regarded as very successful. The learned professions, measured by their

results in the way of contributions to their several sciences, may fairly be compared with those of any other country. Thus in medicine, and in surgery, where the comparison can be better made, we find that the contributions to human needs have been very great. The most important step ever taken in this remedial work—the use of anæsthetics, such as ether—began in this land. It is true that anæsthesia is not in itself a means of healing, but it has not only spared an inconceivable amount of agony, but has made it possible for surgeons to essay a host of operations which could not possibly have been performed on a suffering patient. In the way of direct operations the surgeons of this country have shown a measure of deliberation and daring unexcelled by their foreign brethren of the art. This is not the place for a full catalogue of these accomplishments, but it may be said, in brief, that at least half a dozen ways by which suffering may be alleviated or life saved are due to the medical men of this country who have lived within this century.

One of the first and most important feats of medical discovery made in this country was performed by Dr. John C. Beaumont, a surgeon in the American army. In 1825 this observer had an opportunity to make some most important studies on the process of digestion through a curious accident which had happened to a young man named Alexis St. Martin. This person had received a gunshot wound in the stomach, which had healed in such a manner as to leave an aperture through which the digestive processes could to a great extent be examined. In the process of his inquiry Dr. Beaumont attained results of the greatest value to physiological science, and incidentally of much importance to remedial medicine. His work, indeed, may be said to have been path-breaking.

Dr. Morrill Wyman first practiced the operation of puncturing the chest for the purpose of removing collections of fluid which endangered the functions of the lungs. Dr. H. I. Bowditch extended the practice in this direction, and greatly extended the knowledge of the admirable invention which has proved one of the great resources of modern surgery. Dr. Jacob Bigelow prepared an admirable work on the medical botany of the country; to him we also owe much concerning the limitations of medicine and the natural history of diseases. Dr. H. J. Bigelow improved the existing operations for the removal of stone in the bladder by the process known as lithotrity. To Dr. Ephraim McDowell we owe the operation of ovariotomy, which is justly considered

to be perhaps the most masterly of all the great surgical feats which have been accomplished in modern times. Dr. John Ware first made it clear that delirium tremens was a self-limited disease. To him we also owe the very important distinction between ordinary croup and the membranous malady now known as diphtheria.

The first great advance in the science of gynæcology was made by Dr. James Marion Sims. He may be said to have founded this branch of remedial medicine, and thus to have made one of the greatest contributions to the relief of humanity. Dr. Sims also exhibited a remarkable talent in developing the mechanical inventions required in the peculiar work which he instituted. It is doubtful if in any other field of practice we owe as much to the work of any one man.

Last of all, we may mention the contributions of Dr. J. S. Billings, surgeon of the United States army. These consist in the admirable army medical museum, which has grown under his guidance to be the most important institution of its kind in the world, a unique medical library, and a great bibliography of medical science.

A rough measure of the judgment and technical skill of these American caretakers of the body is afforded by the results of surgical operations during our civil war. The cases were to be counted by the hundred thousand, and the average success of the operations was better than in any other great campaigns. Although some are of opinion that the large percentage of recoveries was in part due to the prevailingly excellent condition of our soldiers, it can not well be doubted that in the main attributable to the fact that we had among our people a very great number of skillful practitioners, who brought not only sound training but vigor and patriotism as well to their appalling tasks. It is well to remember that the percentage of wounds received by the army surgeons during the rebellion was greater than that which befell the officers of any other staff corps, and this for the reason that their duty drew them to the seat of battle, and they did their work unflinchingly, though with but little recognition from the public or from their commanders.

In all matters relating to the law our people have been admirably well served by the men of that profession. The jurists to whom it fell to interpret our national Constitution, and those of the several States, accomplished their difficult tasks in a way which has compelled the admiration of the masters of their calling in

European countries. Much of the best work of this nature is necessarily of an interpretative rather than a creative kind. It has, however, been so well accomplished that the body of decisions in which it is expressed will ever remain one of the great monuments of the law. In this country, even more than in England, our courts have been conservators of the past. They have held more firmly to the traditions of the law than the British courts. Only in one field has our jurisprudence widely departed from ancient usage, namely, in international law. This body of principles is not only modern, but to a great extent, as regards its origin, American. It is, indeed, an interesting fact that our people, following the wise counsel—we might almost say the will—of Washington, as set forth in his Farewell Address, have kept clear of foreign entanglements, should at the same time have done the most, through the bench and the Legislature, to extend the principles of justice abroad over the earth. In large part this has been accomplished by referring to courts of arbitration matters such as of old would have been settled by armed conflict. It is interesting to note that the decisions of these courts, though in such cases as the Alabama claims and the Bering Sea fisheries concerned questions in the highest degree calculated to breed hatreds, have always been unhesitatingly, and indeed with satisfaction, accepted by both the parties in the contest. It is doubtful if the events of any wars have ever been so welcome to either side as the judgments given in these peaceful trials. It seems not unlikely that by an extension of international law the United States is to have its most immediate and profound influence in the affairs of the world.

In theology the learning of this country has taken no such distinguished place as it has attained in the other branches. The clergy, though educated and profoundly influential, have, except for the excessive attention which here and there has been given to the details of creed, been more engaged in the care of their flocks than in disputation or researches. There seems, indeed, a distinct tendency among the pastors of this country to obey the cardinal law of American life, which is, first of all, to do the work at hand, and only afterward to consider the learning of it. In this way our churches and their ministers seem to be more like those of ancient times than like those of modern Europe, the feeling for the individual having very properly dominated the idea of formal clerical functions.

It is in the profession of the engineer, including in that term

all the occupations which demand learning in the application of the natural forces, that our people have made the greatest advances. In the mechanical department of this science and art they have developed a great number of machines to the highest point of efficiency. In certain directions they have led in the process. In locomotives, pumping engines of various descriptions, in agricultural machinery, and those used in sewing, as well as other household arts, they have done path-breaking work. It is characteristic of the greater part of our American inventions that they have been related to the immediate needs of our people. For a long time they pertained mainly to the necessities of the field and the household which were due to the scarcity and high price of labor. Within the past two decades our engineers who are engaged in invention have begun to explore remoter fields, with the result that in various departments, such as electricity, a large amount of highly original work has been done.

In that division of engineering work which relates rather to great and difficult constructions than to novel methods in using the resources of Nature, the labors of our masters of the art have on the whole been eminently successful, particularly in the field of railway construction, where effective results have been accomplished with less expenditure of labor and of time than in any other part of the world. In only one department can it be said that this country has lagged very far behind the European states. Our highways have been from the beginning of a very inferior sort, and are now a disgrace to the country. The reason for this neglect of wagon roads is doubtless to be found in the prevailing poverty of the people, and the lack of good examples of such construction inherited from earlier times. Yet with all the explanations which can be given, the blindness of our people to the evils brought about by ill-conditioned ways of communication suited to neighborhood use must be deemed one of the most inexplicable features of our history. A like retardation may be noted in the development of municipal drainage; the most of our great towns are still very poorly provided with sewers, and consequently have a death rate far higher than is justified by the conditions of climate, food supply, and average physical state of the population. The death rate in this country from evitable causes is probably higher than in any of the more cultivated states of Europe.

It is satisfactory to note that at the present time there are indications which point to a very rapid development of those parts of engineering which pertain to sanitary improvements. Within

ten years an amount of attention has been devoted to problems of water supply and drainage which, in the aggregate, exceeds all that was applied to such matters in the preceding history of the country. There is thus reason to hope that the tax arising from avoidable disease and premature death which weighs so heavily upon our population will soon be much reduced.

In one branch of hydraulic engineering—that which pertains to the control of rivers and the development of harbors—our professional men are as yet less successful than those of the Old World. This is in part due to the fact that our streams needed less attention in order to make them useful ways than those of Europe, and the natural shelters along the coast were well suited to the use of the relatively small ships which served the needs of war and commerce until after the middle of this century. At present there is not a single harbor along the coast from the mouth of the Chesapeake to the Rio Grande which is suited to the larger marine craft. So far our Government has not done anything of consequence to remedy this serious defect. In the river system of the Mississippi our people have had to meet very serious evils arising from the shallow water of the marine delta, the great floods of the main stream and its tributaries, and the lack of navigable depth during times of continuous drought. Great as has been the value of this system of water ways, it has not proved half as useful to the States which border upon it, and to the country as a whole, as it should have been. After a long period of neglect, the national Government, following on the lines of the experience gathered by the Danube Commission, has bettered the entrance from the sea to the main stream. It has begun to convert the upper parts of the main tributaries by locks and dams into canals, and it is essaying the great task of controlling the flood waters in the country below Cairo. Nevertheless, the work which has been done has been slowly and as yet imperfectly accomplished. We have, in a word, failed to meet the greatest engineering problem of this country, if not of the world, in a satisfactory manner.

In the department of engineering known as architecture this country is still much behind the states of the Old World. In part the reason for this retardation is doubtless to be found in the lack of organization which has necessarily characterized our heterogeneous folk. In the colonial period, where and while the settlements were made up of folk derived from certain parts of the Old World, and therefore inheritors of old traditions, the methods of

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building were coherent and in accordance with established traditions. In these various settlements we find a tendency to develop methods of building and architectural form which departed from those of the Old World in the measure made necessary by the peculiar conditions of our life, but this work was done in a rational and coherent manner. With the rapid growth of population the influence of the Old World traditions was gradually lost, and with the first half of the present century the builder's art became utterly confused and subject to every momentary whim. The result is that our dwellings and public edifices are at the present time, with few exceptions, essentially without style, except so far as they represent misconceptions of European architectural types. At present the wholesome influence of the sound training which our builders are acquiring gives promise not of an American style of architecture, but of a rational appropriation of the experience which men have gathered in other lands and times. The result is that the public buildings and private edifices which have been built within the last ten years are much more creditable productions than those of the earlier part of the century. There is, indeed, reason to hope that this period of vagaries in building has passed away.

Although the exterior of our buildings, particularly of our dwelling houses, shows either the absence of all traditions or an imperfect comprehension of them, the methods of construction, from the point of view of economy and wholesomeness, exhibit on the whole a great advance upon those of the Old World. As a whole, our American households are more decently lodged than those of any other country. The dwellings are relatively spacious, well lighted, and the sleeping places so arranged as to give a measure of privacy. The general and skillful use of wood has made these houses comparatively cheap, and the contrivances for economizing labor which they contain have greatly favored the development of a relatively high-grade household life. Thus, while the form of these dwellings is inartistic, and their decorations generally exhibit an unhappy spirit of imitation of Old World architectural motives, their interior arrangements are most sensible, and show in a very clear way the sound workings of the minds of our people when they trust to themselves. In the methods of joining, woodwork and masonry, a practical field, our American work is in many parts of the country exceedingly good, perhaps indeed better than that now done in any part of the Old World.

In that other form of expression which we commonly term literature there is much of the same necessary dependence on the methods of the past which exists in the fine arts; nevertheless, the field affords certain opportunities for the development of local qualities of which our people have in a considerable measure availed themselves. In a natural literature we expect to find a picture of the life of the people. To a great extent such work is true and valuable in proportion as it reflects the experiences of the folk. What may be called the natural literature of America is already large in quantity, and in many ways of high grade. The forensic class of such work, the speeches made before the courts of justice, in our Legislatures, and in a measure at our political gatherings, though not at present much regarded, seem to the writer to exhibit a great deal of intellectual power, and often a literary skill of a high order. He remembers the wonderful debate which preceded the decision as to the course of the Commonwealth of Kentucky in the civil war. The public men of that time, those representing both the causes, inspired by an enthusiastic sense of duty, did their tasks with a large measure of forensic ability. It is doubtful whether in any other time or country a people were ever so swayed toward action by public speaking as before and during the period of the civil war. It may be said that there was no Demosthenes at that time, but there were hundreds, if not thousands, of men who were true orators, and who did their task in a manner which may be fairly termed classic. Measured in a large way, the writings and speeches of that time entitle it to be considered one of the most noteworthy in the history of the world. Like other things American, the work was for the moment rather than for all time, yet the results will endure for ages.

The strength of any state, the promise which it affords, is to be measured by the public spirit of its citizens; it is hardly too much to say that a state in its essence is an emanation from the devotion of its citizens, those of the day and of the past, to the public good. It is well-nigh impossible to gauge the measure of this state-building motive, the spirit which seeks to add something of each individual life to the enduring good of the society and the nation which may spring from it. Therefore we may note but two peculiarly clear tests by which we may measure, perhaps in an inadequate way, those forces which we are considering.

The war of the rebellion may be fairly described as the most public-spirited contest in history. It was a unique struggle, for

the reason that both the combatants were fighting for theories of social order. It is true that at the time there was more or less natural denunciation by one side or the other. The North believed that the South was fighting with the single intent of upholding slavery; and the South claimed that the Federal Government, controlled by the manufacturing industries of the country, was endeavoring to maintain its commercial interests. Looked at from a distance, however, it is easy to see that larger conceptions moved the contestants. On each side the effort was to maintain the social and political system which seemed to the people of the two sections best calculated to promote the public good. For the first time in the history of the world there was a great war which did not relate to dynasties, to conquests of territory, or to creeds, but to theories of government. The close of the struggle, so peculiar in the swift ensuing harmony between the divided parties, shows how each was prepared to believe the course of the other to have been actuated by patriotic motives. In all such matters the desires of men are complicated, but in this instance the element of mutual respect doubtless went far to heal the wounds inflicted by the greatest struggle of modern times.

The willingness with which the citizens during our civil war gave their lives and property to uphold their theories of government shows very clearly that our people are not only in the common sense patriotic, but are much disposed to sacrifice themselves to their ideals. There can be no question that the love both of life and property is very strong among our folk. The devotion to wealth is by some observers thought to be greater than in any other country, but on both sides, during the great contest, life and its goods were lavished for ideals little known elsewhere. This instance is of itself enough to show that behind the eager money-getting humor so commonly displayed by our men, there is a reserve of dutyfulness which needs but to be effectively called on to bring forth the freest self-sacrifice. It is, indeed, only in those parts of the country where the population is really un-American, owing to the large admixture of those born in foreign parts, or who inherit foreign traditions, that we find any reason to doubt the public spirit of our citizens. Even though the system of government in our cities is bad, the social and economic order is generally satisfactory save where the population is largely un-American. In places like New York city the lack of civic sense is evidently due in large measure to the unnaturalized character of the population, as well as to the peculiarly commercial spirit

which to a great extent actuates the people. With few exceptions it may be said that the debasement of our cities, which should be a source of wonder and shame to every intelligent citizen of the country, is in direct proportion to the share of foreign voters which they contain. It should be noted, however, that the quality of these foreigners varies exceedingly, according to the countries whence they come and the social grades of those lands from which they are drawn. Fortunately, a considerable part of those who immigrate from Europe are already natural born members of our state.

The public spirit of our people is best shown in the willingness with which all classes, even the poorest, give of their means and interest to any public need. In part, this may be attributed to the relative ease with which wealth is acquired, and to the abandonment in this country of that desire to found families upon wealth which is so common in the Old World. Whatever be its origin, there can be no doubt that our people have developed a singular disposition to turn their fortunes toward public ends. It is rare indeed that a man of wealth passes away in this country without showing by his bequests that some large ideal of public good has more or less occupied his mind, however complete his devotion to money-getting may have been. Of late years these gifts have ceased to be in the main testamentary; men have learned the use and comfort of expending their fortunes during their lifetimes. Such work as was done before his death by George Peabody, and that accomplished by many others still living, clearly shows the rapid development of benevolence, and gives promise that in the future, whatever evil there may be in amassed wealth is likely to pass away with the growth of this motive.

The forelooking quality of the American public spirit, and its clear sense as to the prime need of our times, is shown in the devotion of nearly all the large gifts to educational purposes. It is unfortunately true that these benefactions are often better in their motive than in their plan. From them have come a host of small educational establishments which, while they do some good, and are often very advantageous to the communities in which they are founded, tend to weaken our higher education and to hinder the growth of those great establishments which alone can serve the needs of the highest education. It is a curious fact that this school-building motive of testators, and those who give in their lifetime, appears to be in this country less well advised than

a similar movement which appeared in Great Britain in those centuries when the foundation schools and colleges of that country were established. In those ages men very generally gave either to simple local schools, or, if they devoted more means to the undertaking, they founded colleges at Oxford or Cambridge. In the second great movement of school-founding—that which now characterizes this country—the sectarian and local motives appear to have turned the minds of benefactors away from any enlarged plan of education.

The most menacing feature which is discernible in the study of the state of the public motive in this country is to be found in the unwillingness of our citizens to take an active part in political work. So far as voting is concerned, the duty is better performed than in any other country, the percentage of the vote polled in important elections often being as great as eighty per cent of the total. The neglect begins where labor is needed in caucuses, and it extends to the duties of office, it being often difficult to persuade the abler citizens to make the sacrifices which have to be incurred in assuming public trusts. These evils are due in part to the overconfidence of our people in all that concerns the security of their institutions, and in part to the large opportunities in the way of fortune and of business preferment which comes therewith that the uncrowded country affords. The result is the creation, in this country, of a distinct class which makes a profession of politics. While in Europe the legislatures frequently contain men who have acquired distinguished station in literature or science, such persons are almost unknown in our American councils. If this unhappy division of labor be not rectified, the effect on our institutions will in time undoubtedly be disastrous. It will bring once again government by caste or class in place of that by the people. The essence of a true democracy consists in the fact that the abler minds of the population have in it their natural share in determining the conduct of affairs. When such a government loses its truly representative character, and in so far as it does so, it ceases to be a republic. Every citizen who fails in these elements of duty to the State thereby aids to overturn the institutions of his country.

The final judgment of any social system must rest upon the effect which it has in developing the individualities of the people who dwell within it. The largest measure of success is not represented by the stability of the Government, the wealth of its citizens, or even the share of influence which their state may have in

the affairs of the world. The true test is found in the advancement of its men and women to the state where they are in the largest sense free, where their development is favored by their conditions. There can be no question that up to the present time this country has given to its citizens a measure of opportunity for growth such as has been afforded by no other great state. So far as the law of the land is concerned, this liberty has been for those of European ancestry complete. Those elements of control which depend upon motives not expressed in statutes, but which operate through social traditions, and which give rise to caste, are still and perhaps inevitably strong. In some parts of the country—indeed, we may say generally—wealth is the test which determines station; but in the older States, particularly in those which were lately slaveholding, ancestry is as much valued, and has nearly as much influence in favoring or hindering the advancement of men, as it has in the Old World. These social divisions rest upon affections and prejudices which are innate, and which can only be in a measure diminished in their intensity by a democratic political system. It is because association in politics serves to bring all classes together on a common ground, quite as much as for the political result, that the abstention from such public duties on the part of our men of leisure and opportunity is to be regretted.

Perhaps the greatest gain in the way of freedom which has been won in this country is in the field of religion. The most characteristic of our American colonies were, as before remarked, founded by men who sought in the New World exemption from the persecution to which they were subjected on account of their faiths. They did not seek to found communities which should be in our sense free; they sought, rather, conditions where they might in safety develop their own religious, or rather priestly, government. True, religious freedom was forced by the conditions brought about through the rapid immigration, which introduced into the communities people of varied beliefs. For more than a century we may perceive the continuance of this effort to establish societies which should be sanctuaries of the diverse sects. Each essayed to fence in some bit of the wilderness, making it safe from all other grades of opinion. The number of these curious sectarian settlements which were founded in this country is great; a carefully made list would probably show a total of some score.

Not the least of the many advantages which this country has

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reaped from European immigration and the rapid intermigration of its people is to be found in the swift destruction of sectarian communities which was thereby brought about. Men were forced in politics and business to deal with fellow-citizens and tradesmen of antagonistic beliefs. In this way those infernal motives of religious fury which for ages plagued a great part of Europe were to a great extent, though even as yet incompletely, swept away. All this amelioration of the ills attendant on fanaticism can not be attributed to the peculiar conditions of our society. Much of it has been brought about by the general advancement of what we term civilization. It has occurred in Europe to a certain degree as well as in America, but a comparison of the present condition in the Old and New Worlds will show the observer that the advance has been very much greater with us than in other lands. If this country had made no other contribution to the estate of man than that with which religious freedom endowed him, it might be fairly deemed successful—if, indeed, it should not on that account be given a foremost place among the world's societies.

It is a singular fact that while the old prejudices which rested upon intense sectarian opinions have to a great extent disappeared in this country, the somewhat related dislike arising from differences of race, with a singular persistency, have remained among our people. Except in some parts of the United States where the negroes are abundant, the white people exhibit, and often feel to an extent that they do not show, an unreasoning dislike to them. Their conduct is even worse toward Indians and Chinamen. When the considerate American observes the behavior of his countrymen in relation to these people, he needs all the optimistic inferences which he can make from their conduct in other regards to support his confidence in their general character. If he judged them by their relations to people they deem inferior in race, he is forced to give them a rather low place in the scale of moral culture.

Whatever advantage there may have been in earlier days derived from the race prejudices which characterize our people, the time when these motives should be tolerated has clearly passed. The evils which they bring about are now a disgrace to our nation, and are totally unworthy of our professions and our opportunities for moral advancement. To remove this evil it needs to be well understood. Our teachers should enforce the dictates of Christianity, as well as the considerations of science, which may

lead our people to see the base and irrational nature of such blind prejudices.

Except in the field where he is moved by race prejudices, the American man distinctly appears as one who is separated from the old mob spirit which leads persons to associate themselves with their fellows in irrational and inconsiderate action. It is unhappily true that mob violence is extremely common in this country; but except where people of alien blood are concerned, either as the victims or actors, there usually is a measure of legal quality evident which removes the deeds from the realm of pure savagery. The vigilance committee, though acting in the manner of a mob, in most cases represents a native though often unwarranted desire to mete out justice against evil-doers. Of late years, at least, the outbreaks of such violence in this country which have not had for their object the punishment of criminals, or which have not been inspired by race hatred, have been generally due to the foreign elements in our population.

It is easy to see that the advance which our people have made on their various lines of endeavor has been in large measure made possible by the prescient way in which they have set about their tasks. It may fairly be said that, grace to our institutions, including our education, our citizens are more inclined than those of any other country to look forward and to shape their action with reference to the time to come. A study of this feature in our conditions makes plain the singular duty which our people owe to a well-understood past. In other countries the conduct of the state may be intrusted to a class of men to whom by tradition belongs the work of guiding the development of the commonwealth; but with us, it is clearly shown by abundant experience, including the lessons of this very day, that the guidance of the state is in the hands of the mass of the people, and not in that of any class. It therefore behooves each citizen to consider his obligations, remembering always that from him rather than from any delegated authority is to come the influences which are to transmit our society unimpaired to future generations.

In the foregoing survey of our national estate enough has been set forth to bring once again before the mind of the reader some part of the matter presented in these volumes, which may serve to ennoble the conceptions which he may form as to the dignity and success of the efforts our people have made for the betterment of their civilization. There are dark chapters in the story—failures and misdeeds of the past, evils of the present, and omens

of future ill—but, as a whole, we may say that our forefathers with valor and wisdom undertook a great task; their successors have continued it in a fit way, and the generations to come will doubtless prove worthy of the burdens which they will have to bear.

In this day we see our citizens grappling with the evils of misgovernment in our cities, and in our Federal system of finance, with the same courage and determination that marked the endeavors of the last generation in the struggles with other menacing ills. As is inevitable with democracies, men make many blunders, but each teaches them something of the truth they need to know. So it has been with all our conquests of the past. The considerate student of this wonderful spectacle of national development may, if he look patiently, well believe with the great leader, that in the long run the people are right, that their patriotism, and the essential right-mindedness from which it springs, will insure the perpetuation and the advance of this commonwealth.

THE END.

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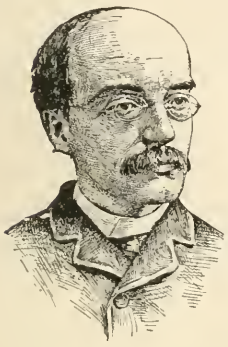

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